the OIL AND GAS JOURNAL

This clean bottom hole pattern was cut in Pink Quartzite by a Hughes W7R hard rock bit.

HUGHES TRI-CONE®
ROCK BITS

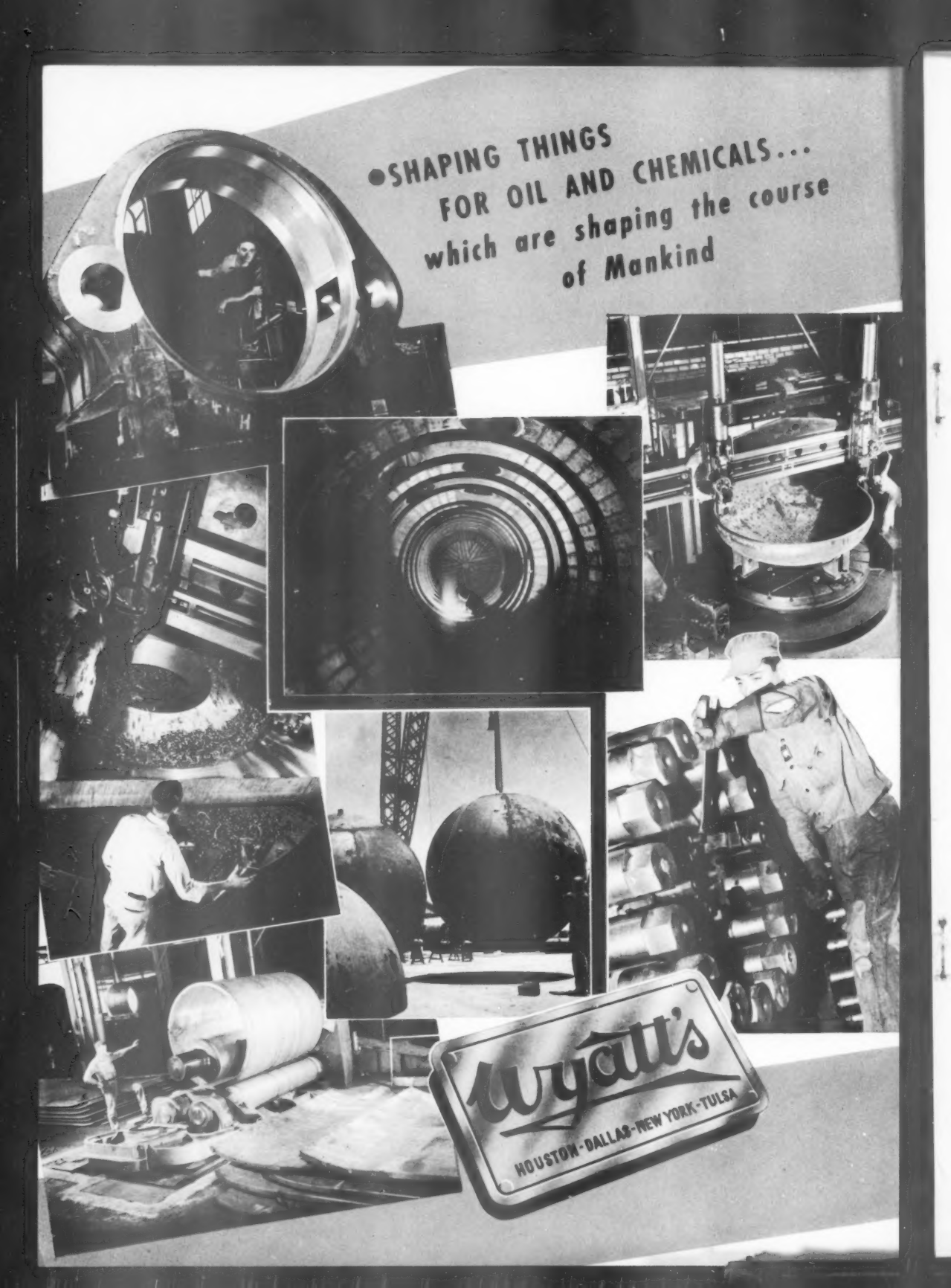
• Designed for faster drilling

Every rock bit cuts a distinctive pattern as it rolls on bottom. These telltale imprints reveal the drilling characteristics of the bit.

That is why research, that brings the bottom of the hole to the surface—where the bit patterns can be studied and bit performance analyzed—plays such an important part in the development of Hughes Rock Bits.

Teams of research and product engineers test-drill every bit undergoing design changes. Blocks of rocks, representing specific formations, are used in these tests made under controlled conditions.

Armed with facts from these studies—and backed by 43 years experience in designing and manufacturing rock bits—Hughes engineers are able to design bits that are recognized the world over as the standard of the industry.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FOR OIL AND CHEMICALS...
which are shaping the course
of Mankind
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THE OIL AND GAS
JOURNAL
Vol. 51, No. 9

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- Turnaround of a Combination Unit.
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Savings up to 42% on fuel oil and lube oil

Fairbanks-Morse does it with dual-fuel engines

...all Ross Exchanger equipped!

"Put your power costs in order with Fairbanks-Morse dual-fuel engines." That F-M statement is based on facts like these:

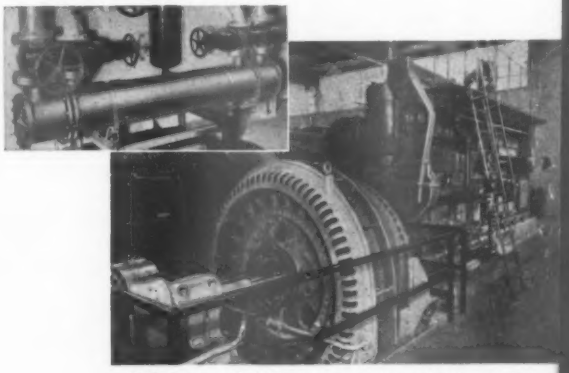
In Minnesota, fuel costs cut 42 per cent. In a Kansas power plant, savings of $19,000 a year in fuel and lube oil. In Arkansas, overall savings of $33,000 annually!

To achieve such economies, many of the engines are in 'round-the-clock operation. Naturally, that means all components must give the same unfailing performance. Take the Ross Exchangers for example. They are and *can be* depended on to keep lube oil and jacket water at proper temperature levels. Downtime or lowered performance through overheating can't be risked.

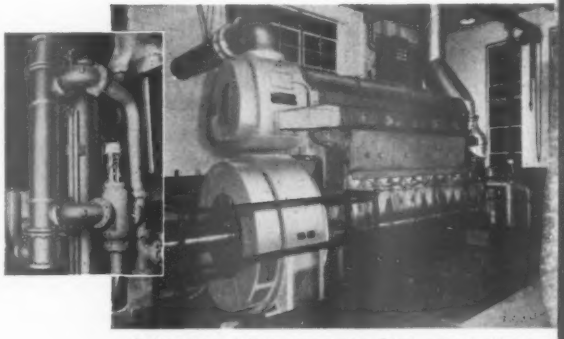
That's why, on Fairbanks-Morse installations, such as the ones shown, you so frequently find Ross Exchangers among the principal equipment. Fairbanks-Morse must safeguard its own in-built quality with components of equally known dependability.

For Diesel, gas or dual-fuel engines of any rating, pre-engineered Ross Exchangers have unequaled advantages: standardization that simplifies engineering, diversification of standard sizes to cover most requirements, and choice of materials for specific conditions.

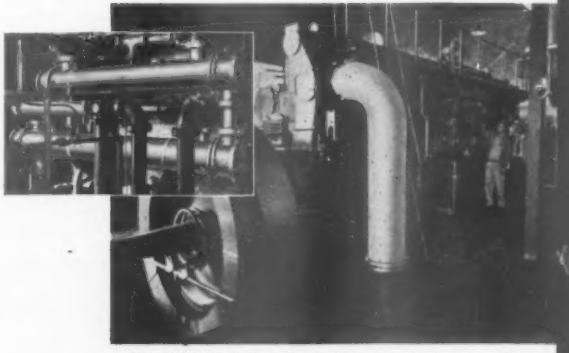
Details of construction, engineering data and collaboration on your specific needs gladly furnished. Bulletin 2.1K1 mailed on request.



Fairbanks-Morse 1400-hp dual-fuel engine equipped with Ross Exchanger for lube oil cooling.



Fairbanks-Morse 1600-hp opposed-piston Diesel equipped with two Ross Exchangers, one for jacket water, the other for lube oil.



Fairbanks-Morse 2000-hp dual-fuel engine equipped with two Ross Exchangers for lube oil and jacket water cooling.

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Only B. F. Goodrich makes the grommet belts that cut costs 20 to 50%!

Save 3 ways! Investigate today! Write or mail coupon

You save belt costs because belts last longer, save production costs because machines keep running with fewer interruptions, save maintenance costs because they need less attention.

Patented grommet belts by B. F. Goodrich represent the only basic change since invention of the V belt. Belts last 20 to 50 per cent longer, depending on service. (The more severe the service, the greater the increase over ordinary belts.) Grommet belts have more rubber; they're more flexible, give better grip, less slip.

What is a grommet?

A grommet is like a giant cable except that it's *endless*—a cord loop built up by winding heavy cord on itself. There is no overlapping cord *section* as in all ordinary belts. Most belt failures occur in these sections where cords overlap!

All cords put to work

Each of the two grommets and every part of a grommet carry their share of the load. In ordinary belts under high tension the center cords "dish" because tension is greater near the driving faces. Dished cords are doing less work, not pulling their share. Grommet belts have no center cords, there is no dishing—therefore much more strength in proportion to cord volume—and less stretch. Grommet belts stretch, on an average, only about one-third as much as ordinary belts.

Better grip, less slip

Grommet belts have more rubber in relation to belt size. Without any stiff overlap, they're more flexible, grip pulleys better. Size for size, grommet belts give ⅓ more gripping power, pull heavier loads with a higher safety factor. Because there is less slip, there is also less surface wear.

Send for proof

Send the coupon for a set of reports telling users' experiences and showing actual installations where grommet belts outlasted all others. Some typical cases:

"... within a few days ordinary belts had stretched ... After six months of 24-hour-a-day service BFG grommet belts haven't stretched at all ..."

"Ordinary belts lasted only 5 or 6 weeks ... B. F. Goodrich grommet belts are in their sixth month of service ..."

"Previous belts suffered from shock loads, wore out fast ... BFG grommet belts have been in service 2 years with no shut-downs..."

There are hundreds of cases like these.

They cost no more

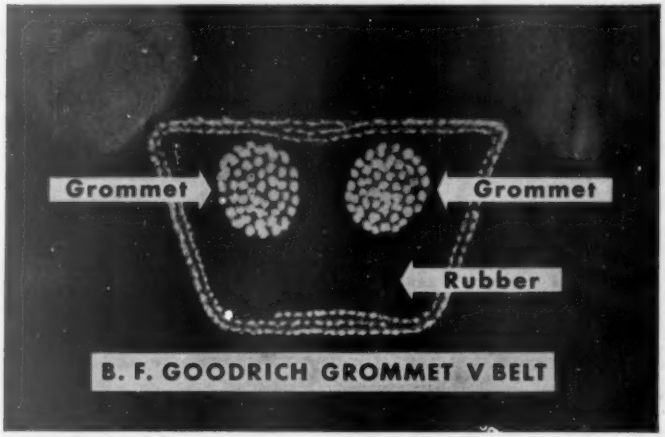
BFG grommet belts cost not one cent more than others. The savings they make for you are clear profit. They are made in C, D and E sections. They are patented by B. F. Goodrich. No other V belt is a grommet belt (U. S. Patent No. 2,233,294).

Write, send the coupon or see your B. F. Goodrich distributor. (He will show you his "X-ray" belt that shows the grommet construction clearly.)

Grommet V Belts BY

B.F.Goodrich

FIRST IN RUBBER



The B. F. Goodrich Company
Dept. OJ-7
Akron, Ohio

☐ Send set of reports telling users' experiences and showing actual installations proving that B. F. Goodrich grommet belts outlast all others.

☐ Have distributor show me the "X-ray" belt that shows how B. F. Goodrich grommet belts are made.

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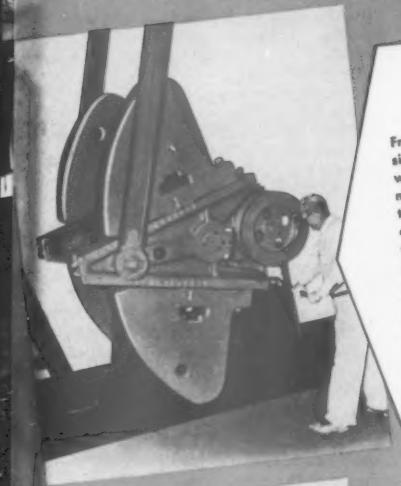
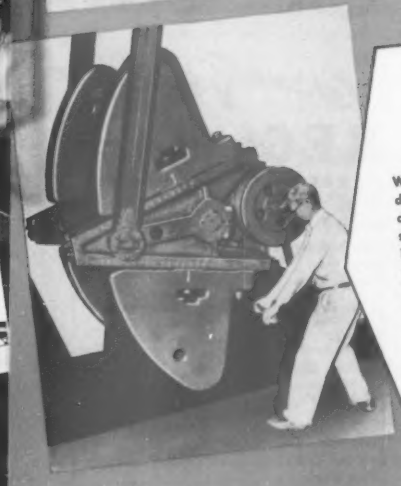
ANNOUNCING...

Type "F" Cranks

for "Oilwell" Pumping Units sizes 12G12 and larger!



From a position at the side of the unit, one man with a ratchet wrench moves counter-weights to the desired position on calibrated slide rails, by turning a large acme-thread bolt which is a permanent part of the Type "F" Crank assembly. This bolt acts as a locking means against horizontal movement of the segments at all times.



When weights reach the desired position, they are clamped against side sway by the two clamping bolts which are part of each weight assembly. The pumper can always work from the side of the unit and need never be within the line of travel of the pitmans.

Counterbalancing

now becomes a SAFE and EASY ONE-MAN JOB!

● With Type "F" Cranks, "Oilwell" Pumping Units may now be counterbalanced safely, quickly and exactly.

Photographs at the left illustrate the ease and precision with which crank-weight adjustments are made.

Crank-weight segments of various sizes are fully interchangeable, so that a complete range of counterbalancing effects can be achieved for each unit in accordance with the pumping conditions involved.

With the inherent stability and conservative ratings of "Oilwell" Pumping Units, the addition of this accurate method of counterbalancing permits safe and rapid adjustments to meet any change in well conditions or operating speeds.

Ask . . . your friendly "Oilwell" Representative for complete information.

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A New Achievement

.... in simplified, automatic Tank Gauging

"Varec" FIGURE NO. 2500 AUTOMATIC TANK GAUGE

FOR ALL TYPES OF LOW PRESSURE TANKS
READINGS UP TO 70 FT.

"VAREC", a pioneer in the development and manufacture of automatic tank gauging equipment has applied new fundamentals of design and operation to the Figure No. 2500 Gauge for the ultimate in accurate liquid level reading and dependable, trouble free operation.

Representing a major improvement with this new concept of simplified automatic tank gauge design, the "VAREC" Figure No. 2500 now utilizes the revolutionary Neg'ator Motor (Pat. No. 2,063,799) housed within the gauge head, to maintain a predetermined constant tape tension. This eliminates the need for a conventional counterweight.

Here's a Look Box You Can Read Easily, Accurately!

(Shown approximately ⅝ actual size)

EASIEST TO INSTALL because:
Both counterweight and counterweight pipe have been eliminated. This permits installation of the look box at any desired height from the ground or on top of tank.

EASIEST TO READ because:
Full view Counter in the Look Box for quick, accurate reading of foot increments and a dial for reading inches and fractions. Use of large distinct numerals minimizes chance of reading errors. Eliminates calibrated tape.

EASIEST TO OPERATE because:
"VAREC" patented Gravity Compensator (Pat. No. 1879805) is incorporated with "inch reading" dial. An external Gauge Check device (Pat. No. 2555593) permits manual checking of gauge operation when desired.

EASIEST TO MAINTAIN because:
All internal parts of the Figure No. 2500 Look Box are non-sparking in contact with each other.
Non-corrosive Graphitar tape sheave bearings — self lubricating.

The "VAREC" Figure No. 2500 Automatic Tank Gauge is gas tight. It is adaptable to all types, arrangements and installations of low pressure tanks up to 70 feet in height. "VAREC" Figure No. 2500 Gauge Head is available as a separate unit and can be installed on existing float operated type tank gauges utilizing ½" wide tape sheaves.

Provision has been made on the Look Box housing for installation *at any later date* of a "VAREC" Electronic Remote Reading Gauger Transmitter for use in conjunction with the various models of "VAREC" Electronic Gauger Receivers.

If you are not yet realizing the many time and money saving features and advantages of automatic tank gauging in your operations, install this new, simplified "VAREC" Figure No. 2500 Automatic Tank Gauge and start out ahead. Write or call your nearest "VAREC" Representative for all the facts.

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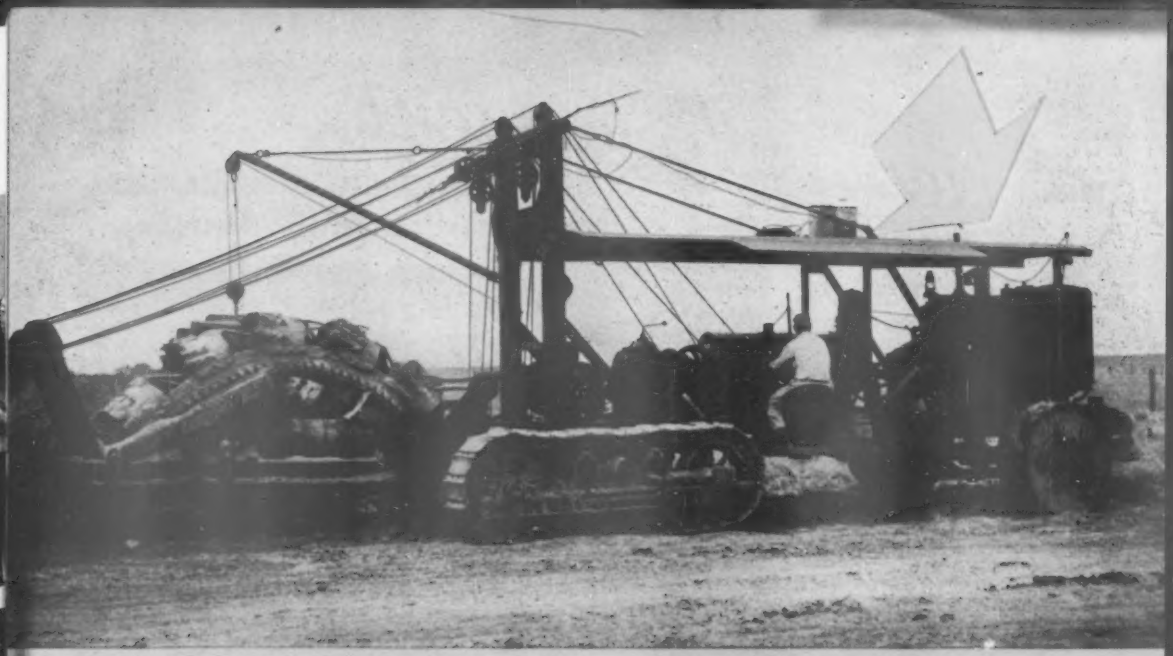

On ~~Down~~-time

Aggravating, money-grabbing down-time has been eliminated on this 42-mile pipe-laying job by a tireless "Caterpillar" Diesel D13000 Engine. Houston Contracting Co., Houston, Tex., declares flatly "the job is on schedule due to dependable 'Caterpillar' power."

For four bustling years, the hard-working D13000 Diesel has pumped unfailing power into this Buckeye Ditcher *without a shutdown for repairs.* On a job, its unflagging output is required the clock around or the entire operation squeals to a costly halt.

"This is the only ditcher on the job," reports a company foreman. "It runs 24 hours a day. Progress of the entire job depends on this ditcher."

The big mucker is digging 6,000 feet a day of a 6-foot trench 44 inches wide. The 30-inch loop line between Cypress and Fostoria, Tex., is being laid for the Tennessee Gas Transmission Co.

"Caterpillar" Diesel Engines have their inexhaustible energy built into them at the factory. Their fuel systems are designed so you can forget about operating adjustments. Their injection valves are interchangeable. They burn low-cost, non-premium fuels without fouling.

Specify "Cat" Diesels in the equipment you buy. And, visit your "Caterpillar" Dealer. He has a wide selection of dependable power units to keep your job on schedule.

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CATERPILLAR

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DIESEL ENGINES
TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

Will Your Pressure Regulators Last 25 Years?

...on Molding Press Service

for instance

THE INSTALLATION

Crane Brass Pressure Regulators on steam lines to rubber molding presses; Dryden Rubber Division, Sheller Mfg. Corp., Chicago. 225 units in service.

VALVE SERVICE RATINGS

FEATURES:	Equally good on steam or air
SUITABILITY:	Steady outlet pressure-No drift
MAINTENANCE COST:	Routine servicing only
SERVICE LIFE:	Many installed more than 25 years—Still O.K.
OPERATING RESULTS:	Fully automatic steam control at lowest cost
PRICE:	Good Buy-has no equal
AVAILABILITY:	Stock item in Crane Line

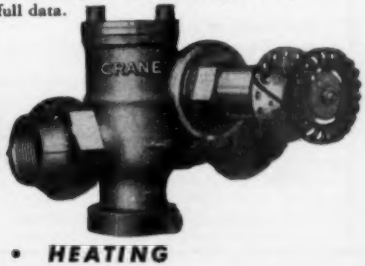
THE HISTORY

Steam generated at 130 psi is reduced through individual regulators on molding presses. Pressure used at machines is 60 to 100 psi depending on work. Features of regulator service needed most are: (1) nonfluctuating outlet pressure automatically maintained within close regulation; (2) easy adjustment by press operator to specified pressure for given work.

More than 25 years ago the plant standardized on Crane Regulators, a total of 225 being in use today. Many are the original installations, still delivering desired outlet pressure. Records for all regulators, regardless of age, show no maintenance cost other than prescribed simple routine servicing. On old models of the Crane 960 regulator, after prolonged service, this includes occasional regrinding of seats.

THE VALVE

Crane No. 960 Brass Pressure Regulators reduce steam or air pressures up to 250 psi, to within 80% of inlet pressure. Factory pre-set to operate within any of 4 ranges from 1 to 200 psi, with easily selected service pressure within set range. Precision made; fully automatic; highly dependable, even under reasonable fluctuation of inlet pressure. All wearing parts renewable. See your Crane Catalog or Crane Representative for full data.



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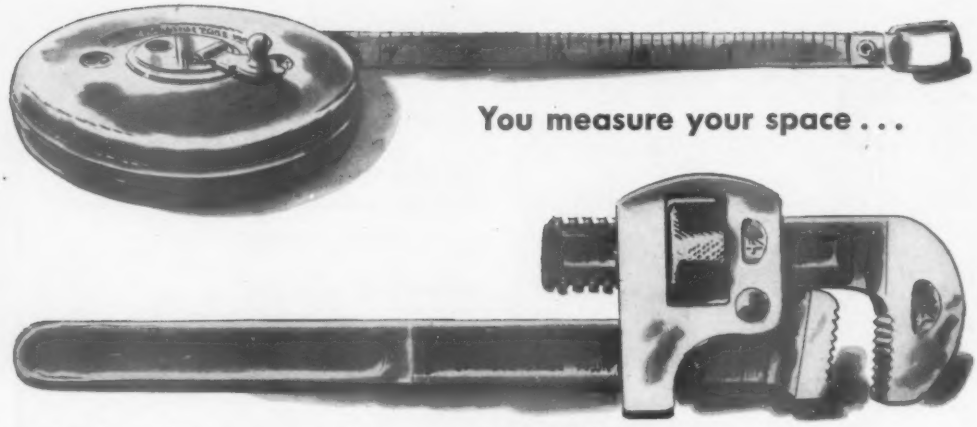

You measure your space . . .

anybody who can cut pipe can install them

Here's inexpensive built-in carbon dioxide fire protection against normal flammable liquid and similar industrial hazards.

The new Kidde Standard Pak is a ready-made, pre-engineered fire extinguishing "package" for volumes up to 6,000 cubic feet. Anyone who can cut pipe can install it. Each kit contains dependable Kidde rate-of-rise heat detectors, efficient Kidde Multi-jet nozzles, and automatic discharge heads. Paks are supplied with or without pipe and fittings. Optional accessories include pressure trips and switches, remote controls, sirens, gongs.

A choice of six sizes assures you of the right package for your particular requirements. For complete information send us coupon below.

Please send me details on the New Kidde Packaged Fire Extinguishing System

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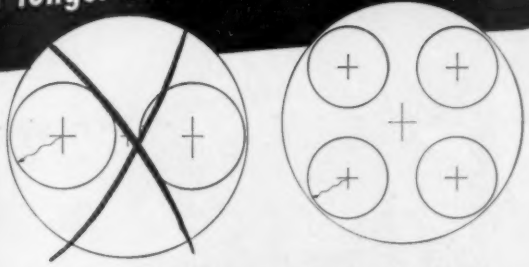
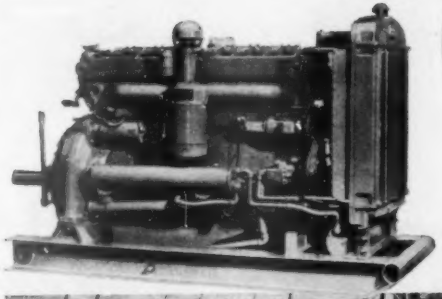
Here's why

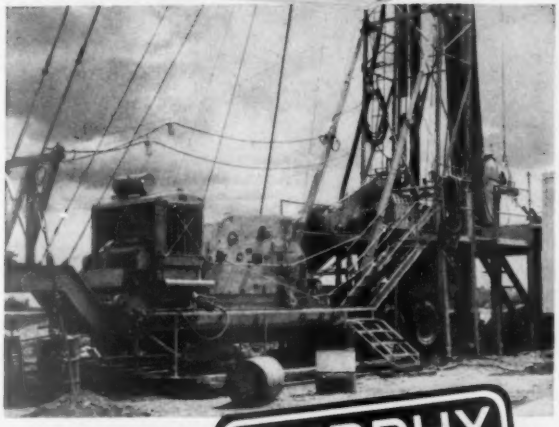
MURPHY DIESELS

put more power into your job

with longer life and less maintenance







Cardwell Model L Trailer-mast servicing unit owned by Redwell Servicing Co., Edmonton, Alberta, Canada. It is powered by a Murphy Diesel rated at 125 H.P. continuous 140 H.P., intermittent.

MURPHY DIESEL

THE power a diesel engine develops is dependent to a great degree on the breathing capacity of the valves. Breathing capacity of the valves in turn is determined by the circumference of the valves and their lift. Thus, when we compare Murphy Diesel's 4 valve design with the conventional 2 valve design of equal total valve area, simple arithmetic shows that total circumference of the 4 valve arrangement is 41.4% greater. With equal lift, the breathing capacity is also 41.4% greater.

At the same time, Murphy design provides 41.4% more metal-to-metal contact between the circumference of the valve and the seat for dissipation of valve heat. This, coupled with the smaller valve radius in 4 valve design (which means the heat has a shorter distance to travel to escape), explains why Murphy valves run cooler and rarely, if ever, have to be ground.

Four valves per cylinder is just one of the many reasons for Murphy's high standards of performance and economy. Others are given in the booklet "10 Questions to Ask a Diesel Engine Salesman". Get a copy from your Murphy Diesel Dealer or write direct.

Heavy duty power

for the oilfields

Murphy Diesel Engines and Power Units for drilling and pipe line pumping, 90 to 226 H.P., 1200 and 1400 RPM. Generator Sets, 60 to 140 K.W. Dual-Fuel Engines, 135 to 180 H.P. Also Crude Oil Burning Engines.

222

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HELPING AMERICA BUILD FASTER

Lumbermen and Beechcrafts work together

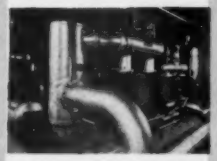
Key men in almost 50 lumber concerns today get *more* done with company-owned Beechcrafts. They go when they need to — they give those distant jobs "on-the-spot" attention. They cut field-trip transit time as much as 75% by use of their Beechcrafts.

Almost every kind of business can profitably use company-owned Beechcrafts, and help America build *faster* by applying travel speed to defense and consumer goods production alike. Apply Beechcraft travel schedules to your business operations. Call your Beechcraft distributor. Or write today on your company letterhead to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

8 JVG in East Texas

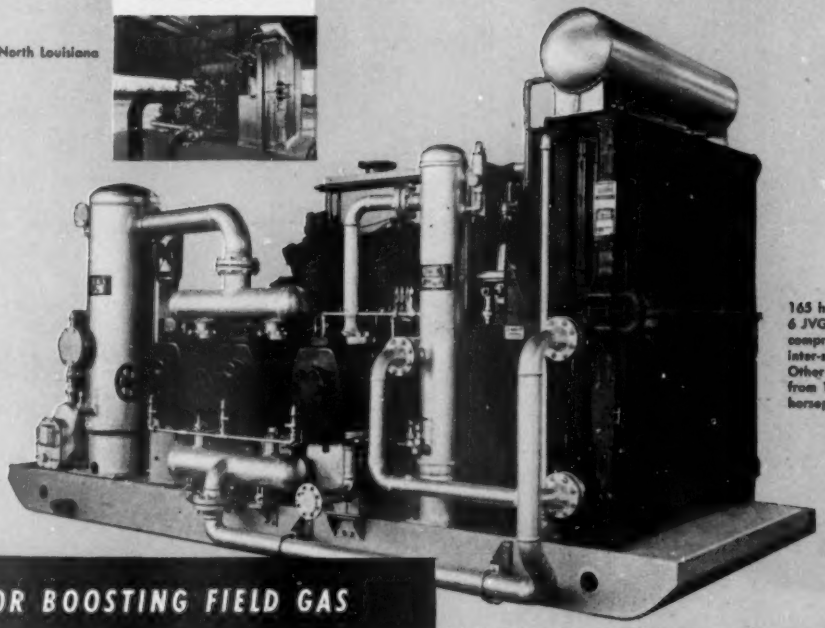
8 SVG in Texas Panhandle



6 JVG in North Louisiana

BEAIRD Ingersoll-Rand

PACKAGED COMPRESSOR PLANT



165 horsepower 6 JVG with two-stage compression and inter-stage gas cooling. Other sizes available from 110 to 550 horsepower.

FOR BOOSTING FIELD GAS

Maintain full gas production when well head pressures drop, with a Beaird Ingersoll-Rand packaged compressor plant.

Low cost per horsepower, installed, makes this packaged compressor the most economical means of boosting your field gas to gathering line pressures.

LOW COST INSTALLATION — complete packaging and full assembly in the factory save on installation costs.

24-HOUR OPERATION — heavy duty, 4-cycle engine built for continuous day-in, day-out service, year after year.

NO ATTENDANT NECESSARY — automatic controls stand watch over operation; only routine maintenance required.

USES EXISTING GATHERING LINES — may be installed near wells in present gathering system.

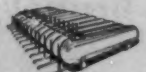
Write for your copy of the new booklet on Beaird-Ingersoll-Rand packaged compressor plants.

THE J. B. BEAIRD COMPANY, INC. SHREVEPORT, LOUISIANA

L P GAS SYSTEMS

CAST STEEL FITTINGS

ANHYDROUS AMMONIA EQUIPMENT



PRESSURE BULK STORAGE

MACHINING
FABRICATING
STEEL WAREHOUSE

BEAIRD

SHREVEPORT

LOWEST COST PER HORSEPOWER, INSTALLED

ASK THE AEROFIN MAN

For the Practical Answer to Your Heat-Exchange Problem . . .

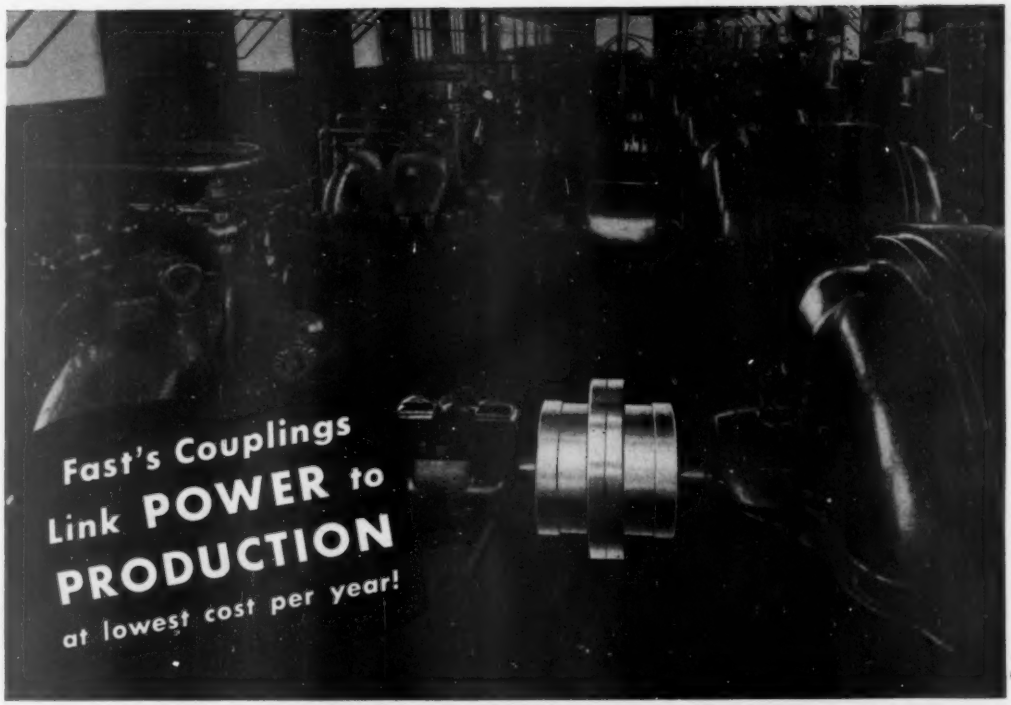
Aerofin is sold only by manufacturers of nationally advertised fan system apparatus. List on request.

There is a competent Aerofin heat-transfer engineer near you, qualified by intensive training and long experience to find the *right* answer to your own particular heat-exchange problem.

This specialized knowledge is there, ready for you to use to your greatest advantage. Ask the Aerofin man — and be right.

AEROFIN CORPORATION

410 South Geddes St., Syracuse 1, N. Y.



Over half a million FAST'S Couplings now in use!

THROUGHOUT industry, Fast's are rated the most dependable couplings on the market... to the tune of over half a million now in service! Year in, year out, they continue to *outlast the equipment they connect* . . . save time, maintenance and money by eliminating costly coupling failures.

Actual cases on record show many Fast's Couplings have been in operation for 25 and 30 years without trouble. And every major producer of high-speed equipment now uses Fast's!

Solve your coupling worries! Write today for full details on Fast's Couplings and Koppers Engineering Service to: KOPPERS COMPANY, INC., *Fast's Coupling Dept.*, 287 Scott St., Baltimore 3, Maryland.

Here's How FAST'S Save You Money

Free Service—Koppers free engineering service assures you the right coupling for the job.

Rugged Construction—Fast's still maintains its original design, without basic change or sacrifice in size or materials. Result: freedom from expensive coupling failures.

Lowest Cost per Year—Fast's Couplings usually outlast equipment they connect. Their cost may be spread over many years!

KOPPERS

FAST'S
THE ORIGINAL
GEAR-TYPE
Couplings

INDUSTRY'S STANDARD FOR 32 YEARS

KOPPERS COMPANY, INC., *Fast's Coupling Dept.*
287 Scott St., Baltimore 3, Md.

Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

Name _____

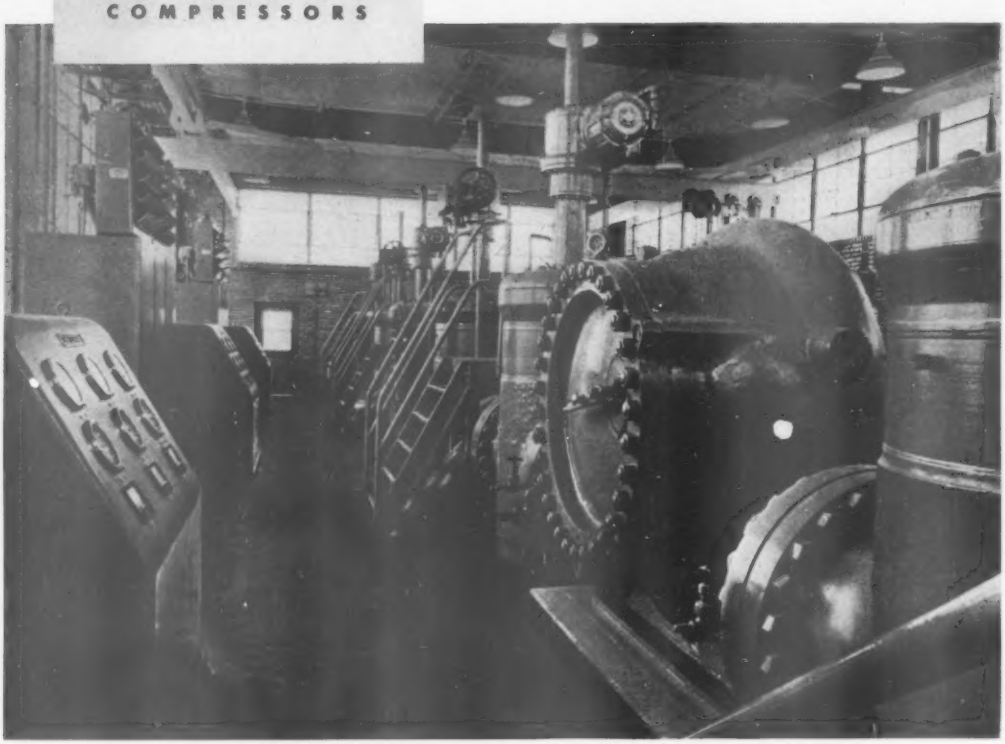
Company _____

Address _____

City _____ Zone _____ State _____

DE LAVAL
CENTRIFUGAL
COMPRESSORS

on the job at Texas Eastern



The centrifugal compressors on Texas Eastern Transmission Corporation's new 30-inch gas pipeline from Kosciusko, Mississippi, to Uniontown, Pennsylvania, are all De Laval.

Thirteen De Laval compressors will be installed in stations at Barton, Alabama; Gladeville, Tennessee (shown above); and at Wheelersburg and Berne, Ohio. Each station will be equipped with three 2,500 horsepower motor-driven compressors, except Berne, which will have four.

One of the outstanding engineering features of these compressors is the effective use of inlet guide vanes. This De Laval feature provides greater operating flexibility than has been previously possible with constant speed motor-driven units.

Once again De Laval engineering has led the way in developing better centrifugal compressors for natural gas transmission. If you want to know more about the advantages of De Laval centrifugal compressors—consult our engineers. They will be glad to give you the benefit of our wide experience on the major gas pipelines using centrifugals.

DE LAVAL *Centrifugal Compressors*

DE LAVAL STEAM TURBINE COMPANY
Trenton 2, New Jersey

DL 181

for the petroleum industry...

MORE BASIC CHEMICALS FROM MATHIESON

Petroleum refining, like every process industry, requires certain basic chemicals. These chemicals are essential to the transformation of crude oil into hundreds of petroleum derivatives from high-octane gasoline to Diesel fuel.

Mathieson, producer of chemicals for the petroleum industry for 60 years, today supplies more basic chemicals than ever before... such important chemicals as:

Caustic Soda	Ammonia
Sulphuric Acid	Soda Ash
Sodium Bicarbonate	Processed Sulphur
Sodium Chlorite	Diethylene Glycol
Triethylene Glycol	Dichloroethyl Ether

Calcium Hypochlorite

Currently, with market conditions uncertain, a dependable source of supply is especially important. You may be able to buy these chemicals *to better advantage* by consulting with us now. Mathieson Chemical Corporation, Baltimore 3, Maryland.

Mathieson
CHEMICALS

SERVING INDUSTRY, AGRICULTURE AND PUBLIC HEALTH

PRECISION BY THE

A Clark compressor on the job is your assurance of dependable performance. Unrivaled engineering and quality construction, literally precision by the ton, make this dependability possible. From massive crankcases to minute governor parts, unequaled precision standards are maintained to assure extra long compressor life

How are these standards achieved?

1. Clark insists on painstaking care, meticulous, accurate machining of *all* parts affecting the performance and life of the compressor — *no matter what the size or what the function.*
2. Clark has the specialized tools and equipment to produce to unsurpassed, uniformly high precision standards. To meet these standards, Clark has had to build many of its own specialized tools.
3. Clark has the specialized know-how, the skill, the craftsmen. A half century has been devoted solely to designing and precision-building heavy duty compressors for every conceivable need.

The Clark trademark on a compressor is your assurance of extremely long life.

SETTING THE PACE IN PRECISION STANDARDS

CLARK compressors

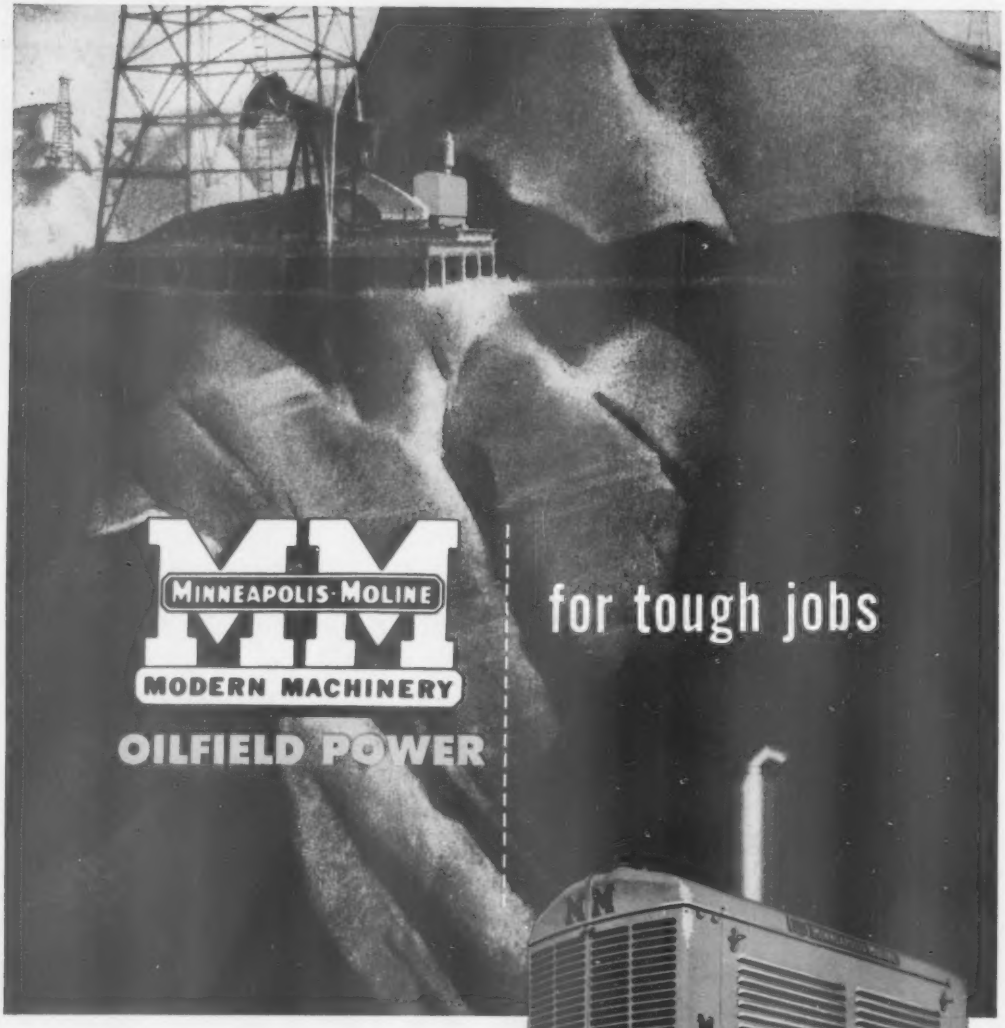
CLARK BROS. CO., INC. One of the Dresser Industries OLEAN, N. Y.

OFFICES IN PRINCIPAL CITIES THROUGHOUT THE WORLD

Gas-Engine-Driven • Steam-Engine-Driven • Motor-Driven • Centrifugal

TON

Final inspection of power piston before lubrizing.



How can this engine operate 24 hours a day for 8 to 10 years without overhaul? Here's the secret—controlled lube oil temperatures and elimination of lube oil contaminants.

Superior methods of filtration cleanse the air, fuel, lube oil and crankcase vapors. Exclusive MM water jacketted base pan maintaining 190° constant lube oil temperature eliminates sludge formation which in ordinary engines combines with dirt and grit to destroy moving parts. Heavy fine grain engine castings easily take severe shocks and strains imposed by oilfield loadings.

Result: Years of economical trouble free operation.

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

distributed by **SHRIMPTON** MANUFACTURING AND SUPPLY COMPANY
LOS ANGELES • OKLAHOMA CITY • KILGORE

Canadian Distributor: Disher Winslow Ltd., Edmonton, Alta.

PETROLEUM CHEMICALS DIVISION
NEWS

July ★ One of a Series of Interest to the Petroleum Industry ★ 1952

Du Pont Celebrates 150th Anniversary

Six thousand Du Pont employees with 10 years of service or more will attend the company's 150th Anniversary ceremonies on July 18th at the site of the original powder mills along the historic Brandywine at Wilmington, Delaware.

Dramatic episodes in the company's history will be enacted on this occasion, augmented by the Du Pont chorus. Speakers will point out the broad philosophy of the company and the effect this philosophy had on its growth. Mr. Crawford Greenewalt, President, will speak on the future of the Du Pont Company, not in a material way, but rather in consideration of the problems of a large corporation in the coming years.

Wide Range of Movies Available to Oil Companies Through Du Pont Film Library

To help you relate your sales promotion activities as closely as possible to the individual interests of your various customer groups, Du Pont makes available to the oil companies a comprehensive assortment of films.

They cover a wide variety of subjects . . . gasoline quality, safety, automotive maintenance, farming and lubrication. There are many general interest films, too . . . on oil industry operations and economics, on research, on the free enterprise system, and even one on how color conditioning can improve working conditions and employee relations in offices and plants.

Not all of the films were produced by the Du Pont Company. Many of them were originally made by the U. S. Bureau of Mines, by oil companies and by automotive parts makers. But for your convenience, they are available through the Du Pont Film Library.

MANY USES

Several of the films are suitable for dealer training and employee education, as well as for sales promotion. And the new Du Pont movie, "Pipeline on Wheels," is specially tailored to the oil industry's public relations needs.

How can you obtain the films? Just write the nearest Du Pont Petroleum Chemicals Division district office for a brochure describing the films in detail and giving complete instructions on how to request the films you want.

"PIPELINE ON WHEELS" Movie Wins A Top Safety Award

Oil Executives Aided in Production of Film . . . Helped Make it an Outstanding Success

The Petroleum Chemicals Division of the Du Pont Company was recently advised by the National Committee on Films for Safety that it had won one of the committee's annual awards for the motion picture, "Pipeline on Wheels."

BEHIND THE SCENES—"Pipeline on Wheels" was produced on location by professional Hollywood directors, actors, cameramen and sound and light specialists.

What's Your Standing Among Competitive Octane Ratings?

You'll find the answer to this important question in the July issue of Du Pont's Quarterly Motor Gasoline Survey.

The results of this survey are scheduled to roll off the presses in the middle of July so that copies will be in refiners' hands during the week of July 21st.

This edition should be of particular interest to refiners and marketers — especially since the TEL shortage has been alleviated and government restrictions lifted.

The film was selected as a co-winner of top honors in the non-theatrical general classification for movies produced during 1951. It was chosen on the basis of its contribution to safety as well as for technical excellence.

OIL MEN CONTRIBUTE

Although "Pipeline on Wheels" was produced by Du Pont for the oil industry, many oil men contributed to its success. In preparing the script, Du Pont consulted over a hundred representatives of the API and NPA, executives of individual oil companies, automotive engineers and safety officials. Their enthusiastic cooperation brought forth many suggestions and ideas which were incorporated in the film. As a result, the film is accurate and authoritative.

OVER

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

DU PONT

PETROLEUM CHEMICALS DIVISION
NEWS

DU PONT

CONTINUED

Movie Award

PUBLIC RELATIONS VALUE

The main objective of this full-color sound movie is to help oil companies overcome some of the prejudice against operating tank trucks on public highways. Produced in Hollywood, the film is specially designed to show the public how tank trucks are built to incorporate every possible safety feature . . . and how the oil companies train their drivers for safe highway operation. It also emphasizes the fact that gasoline tank trucks are vitally important to our modern motorized civilization.

By presenting a case for the tank truck, it is a valuable public relations tool for the oil industry. As such, it is suitable for oil company showings to municipal authorities, safety groups, civic organizations, state highway officials and legislative groups.

All demonstrations shown in the picture are authentic and filmed under the actual conditions described in the script. One of the dramatic highlights of the movie, for example, occurs when an ultra-hot gas-jet fire is built under a tank truck trailer loaded with gasoline. This demonstration provides *convincing proof* that the modern tank truck can be subjected to a severe fire without exploding.

The film delivers its message in the form of an entertaining human interest story. And besides filling a definite need in public education, the film is an ideal aid for training tank truck drivers and maintenance crews.

AN OIL INDUSTRY EXCLUSIVE

Shortly after "Pipeline on Wheels" was released for showings, the demand for its use exceeded all expectations. Originally, since the movie was produced for the exclusive use of the oil industry, 50 prints were made up. But, as requests for the film came into the Du Pont district offices, it soon became apparent that this quantity was not enough. Today, there are 175 prints in circulation among oil companies throughout the country.

What's more, requests for prints poured in from insurance companies, fire departments, trucking firms and many other interested groups. But, because of Du Pont's policy to distribute the film exclusively through oil companies, all of these requests from non-oil organizations were channeled to the oil companies—to enable them to take full advantage of the public relations value of the film.

NEW HEAD OF EXPORT SECTION

WALTER MEES

Holland-born Walter Mees heads up the petroleum chemicals sales section of Du Pont's Organic Chemicals Department. Mr. Mees' appointment to this position some months ago was part of a substantial expansion of the Company's export organization handling such petroleum chemicals as tetraethyl lead, gasoline dyes and antioxidants, Metal Deactivator, grease stabilizers, lube oil additives and cetane.

After graduating from a commercial and technical college in Holland, Mr. Mees entered business in Canada and abroad. In 1929 he joined the Royal Dutch Shell Group and passed through all phases of the oil industry from drilling to marketing.

In 1935 he entered another field, but returned to Shell in 1945 and until 1949 served as General Management Assistant with the Shell Caribbean Petroleum Company in Venezuela. Mr. Mees joined Du Pont in May 1950 and since that time has worked exclusively with petroleum chemicals products.

New Du Pont TEL Storage and Tank Truck Terminal Being Completed on Pacific Coast

Within a few months, Du Pont's new tetraethyl lead storage terminal at El Monte, California will be functioning full blast on behalf of the oil industry in Southern California.

The terminal, complete with railroad sidings for receipt of tank car shipments; and with weigh tank and storage facilities, will make all deliveries via Du Pont-owned tank trucks.

One purpose of this is to make TEL more conveniently available to those refiners who previously had to receive "lead" in drums due to lack of railroad sidings.

The terminal will also help insure an immediate emergency supply of tetraethyl lead to refiners whose regular shipments may have been held up by local floods, or other delays *en route*. And large refiners who for any reason whatsoever may be in need of rush shipments smaller than in R. R. tank car lots can also benefit by the new tank truck delivery system.

Further, to expedite the handling and delivery of TEL, Du Pont-designed Metal-Flex hose installations are used in both the loading and unloading operations at the terminal.

LITERATURE AVAILABLE

Here is a partial listing of the bulletins, reports, booklets and aids available to you through your Du Pont Petroleum Chemicals Division district office:

Safety for the Small Refinery — A 42-page book on how to set up an effective small refinery safety program . . . . . Serial A-2848

Tank Talk — A 52-page, easy-to-understand safety booklet for tank-cleaning crews . . . . . Serial A-1134

Stability of Present-Day Gasolines — A 12-page paper on the value of storage tests—as compared with induction period—for determining stability of modern gasolines . Serial A-3199

DU PONT
REG. U.S. PAT. OFF.
Better Things for Better Living
. . . through Chemistry

Petroleum Chemicals

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • Wilmington 98, Delaware

District Offices: New York, N. Y. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · Los Angeles, Calif.

District Laboratories: Wilmington, Del. · Chicago, Ill. · Tulsa, Okla. · Houston, Texas · El Monte, Calif.

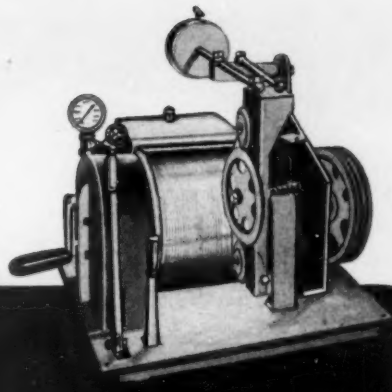
IN CANADA: Canadian Industries Limited — Toronto, Ontario — Montreal, Quebec — Calgary, Alberta

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

A-3663

Printed in U. S. A.

ACCURATE
SIMPLE
DEPENDABLE



HALLIBURTON
MEASURING DEVICES

Foremost in every field, Halliburton Measuring Devices are famous for simplicity and dependability. Because the Veeder Counter reads exact depths directly, all guesswork is eliminated in well measuring.

Other applications include the running of instruments for crooked hole surveys, to obtain bottom hole pressures, temperatures and fluid samples ... running mechanically operated paraffin cutting tools ... offshore surveying which requires accurate linear measurements ... running bridge plugs, drillable squeeze packers and other tools in casing or in open hole.

All Halliburton Measuring Equipment is available for hand operation or mechanical drive – gasoline or diesel power, rear wheel of automobiles, truck transmission power take-off arrangements, cathead operation. Your nearby Halliburton representative will recommend the equipment most economical for your requirements.

STANDARD

HEAVY DUTY

EXTRA HEAVY DUTY

NEW, IMPROVED HALLIBURTON MEASURING LINE WIPER

NEW LATCH TYPE HAY PULLEY

NEW STUFFING BOX AND STAFF ASSEMBLY

ACCURACY ASSURED REGARDLESS OF DEPTH

Halliburton Measuring Equipment is available and built for use in any well regardless of depth. The *measuring device sheave* and *measuring line pressure wheels* are calibrated for .028", .066", .072", .082", .092" or 9/64" and are furnished to correspond with the diameter of *measuring line* ordered. The *reel* selected determines the type of Device required. The size reel needed depends on the diameter of the measuring line, the depth of the well, and the driving arrangement preferred.

ACCURACY MAINTAINED AFTER PURCHASE

You not only buy engineered precision when you select a Halliburton Measuring Device, *you can count on continued dependable performance after purchase!* Halliburton 24-hour service is ready on call to maintain the original accuracy for which these preferred Measuring Devices are famous. Contact your nearby Halliburton representative now, or write Halliburton Oil Well Cementing Company, Duncan, Oklahoma.

YEARS AHEAD IN MEASURING ACCURACY!

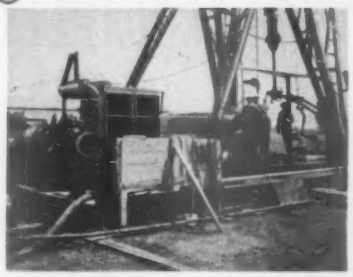
HALLIBURTON

GM Diesel
Case History No. 517-28

USER: T. M. Pruett, Centralia, Ill.

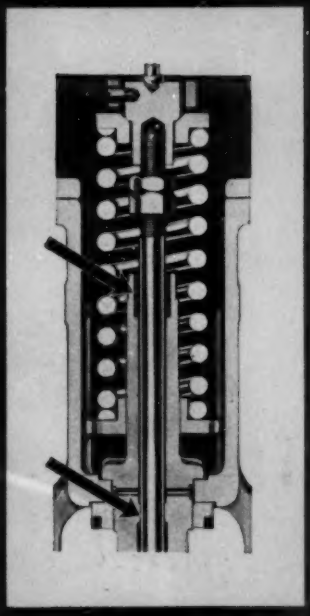
INSTALLATION: Two GM "Twin 6" Diesels, installed January, 1949, powering Unit U15 Drawworks and an A10 Emsco triplex mud pump.

PERFORMANCE: Owner reports this rig completed a round trip at 3,800 feet in 1 hour and 15 minutes, setting back doubles. It drilled 4,000 feet in 14 days through McCluskey, Devonian and Trenton formations (a good record for rigs in this area). In Frogtown area rig drilled 2,200 feet to Devonian in 4 days, 6 hours.



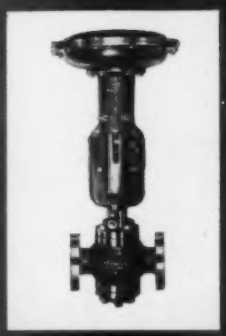
This Diesel made 3800-foot round trip in 75 minutes

GM
GENERAL MOTORS
DIESEL POWER



GUIDED STROKE...

for smoother stem movement



The two-point guiding of the upper stem in the Honeywell Series 700 Valve eliminates side thrust by supporting the stem at top and bottom in continuously lubricated bearings . . . assuring practically frictionless response to the slightest changes in signal air pressure. The Honeywell Series 700 wide band proportional valve comes in a full range of styles and sizes . . . has *all* the features you look for in a fine valve. Write today for your copy of Bulletin 700-2.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, 1906 Windrim Avenue, Philadelphia 44, Pa.

MINNEAPOLIS

Honeywell

VALVE PRODUCTS

First in Controls

WELDING FITTINGS ON YOUR MIND

It will pay you to think of Midwest whenever you think of welding fittings. For example: the variety of elbows offered only by Midwest provides greater latitude in piping design and permits improvements and economies not otherwise possible.

Same radius as ASA but tangent equal to 25% of nominal pipe size on each end. Saves pipe, layout and welding time. Costs no more than ASA. Sizes to 24".

Dimensions conform to applicable size range of American Standard for Butt-Welding Fittings, ASA B16.9. Tolerances much less than allowable. Sizes to 26".

Recommended where space limitations do not permit use of "Long Tangent" or ASA Elbows. Sizes to 30".

Takes the place of a straight size elbow and a reducer. Eliminates one weld, reduces pressure drop, easier to insulate. Sizes to 12", reductions to half size.

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PIPING & SUPPLY CO., Inc.

Main Office: 1450 South Second Street, St. Louis 4, Mo.
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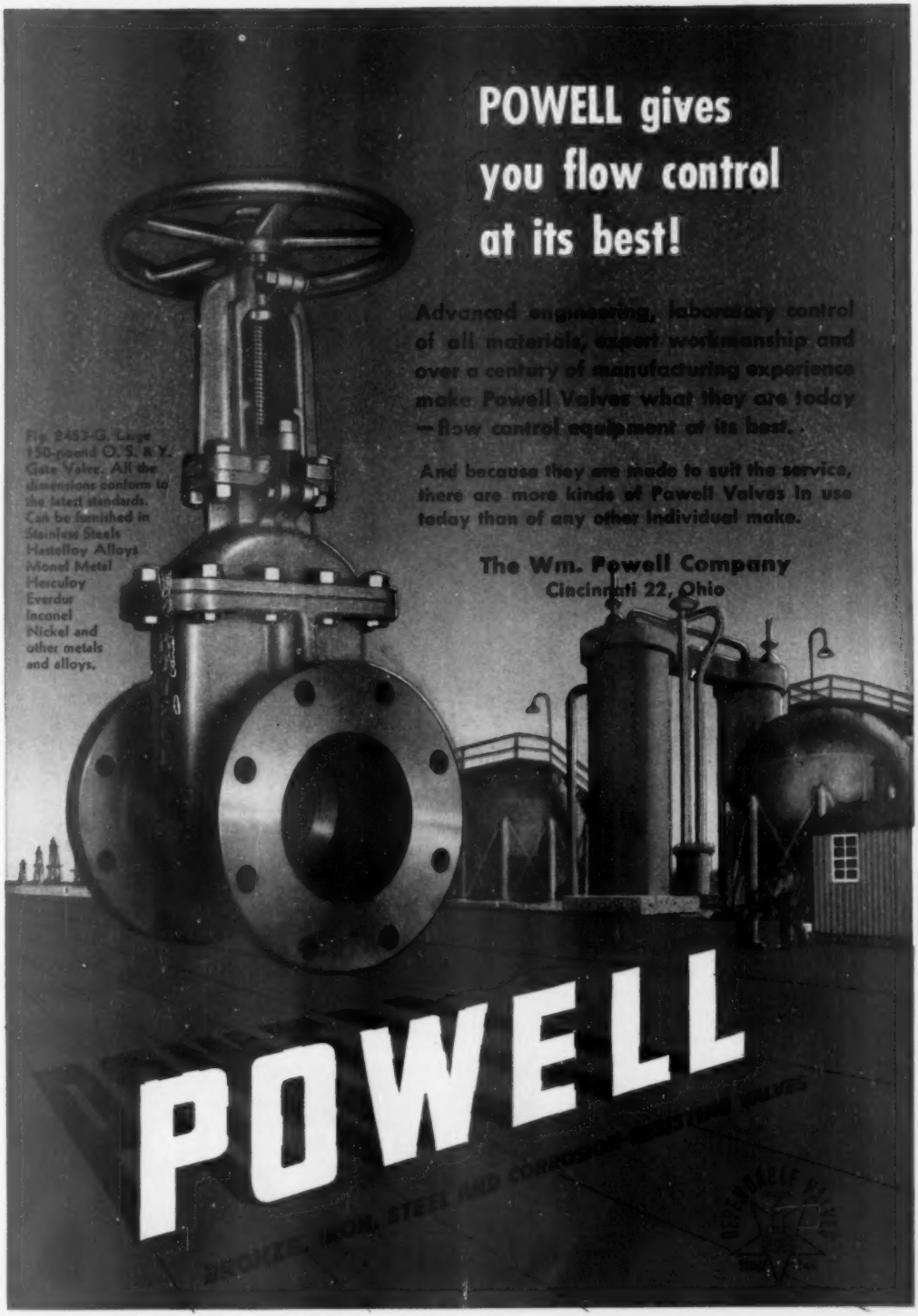
Los Angeles 33—520 Anderson St. • Houston 2—1213 Capitol Ave.
Tulsa 3—224 Wright Bldg. • Boston 27—426 First St.


POWELL gives you flow control at its best!
Advanced engineering, laboratory control of all materials, expert workmanship and over a century of manufacturing experience make Powell Valves what they are today —flow control equipment at its best.
And because they are made to suit the service, there are more kinds of Powell Valves in use today than of any other individual make.
The Wm. Powell Company
Cincinnati 22, Ohio
Fig. 2483-G. Large 150-pound O. S. & Y. Gate Valve. All the dimensions conform to the latest standards. Can be furnished in Stainless Steels Hastelloy Alloys Monel Metal Herculoy Everdur Inconel Nickel and other metals and alloys.
POWELL

Our spread really rolls when we coat with PITT CHEM!

Ask the man who operates a "cat" on a pipeline project and he'll tell you how Pitt Chem Enamels save you time and money. He knows that a spread can cover more pipe per day with Pitt Chem Enamels because they heat up faster, flow better from kettle to pipe, and coat more pipe per ton of enamel.

These benefits of consistent top quality and uniform application characteristics stem directly from our *basic* and *integrated* position. Because we're basic, we can maintain a close control of quality through every step of production from coal to finished product—in a plant devoted exclusively to coal tar coatings. That's why Pitt Chem Enamels speed application above ground and last years longer underground. *We're always ready to help you do a better and faster coating job. Write today for any technical assistance or service you may need.*

★ Standard Grade Tar Base Enamel
★ Modified Grade Tar Base Enamel
★ Plasticized Grade Tar Base Enamel
★ Cold Applied Tar Base Coatings

PROTECTIVE COATINGS DIVISION

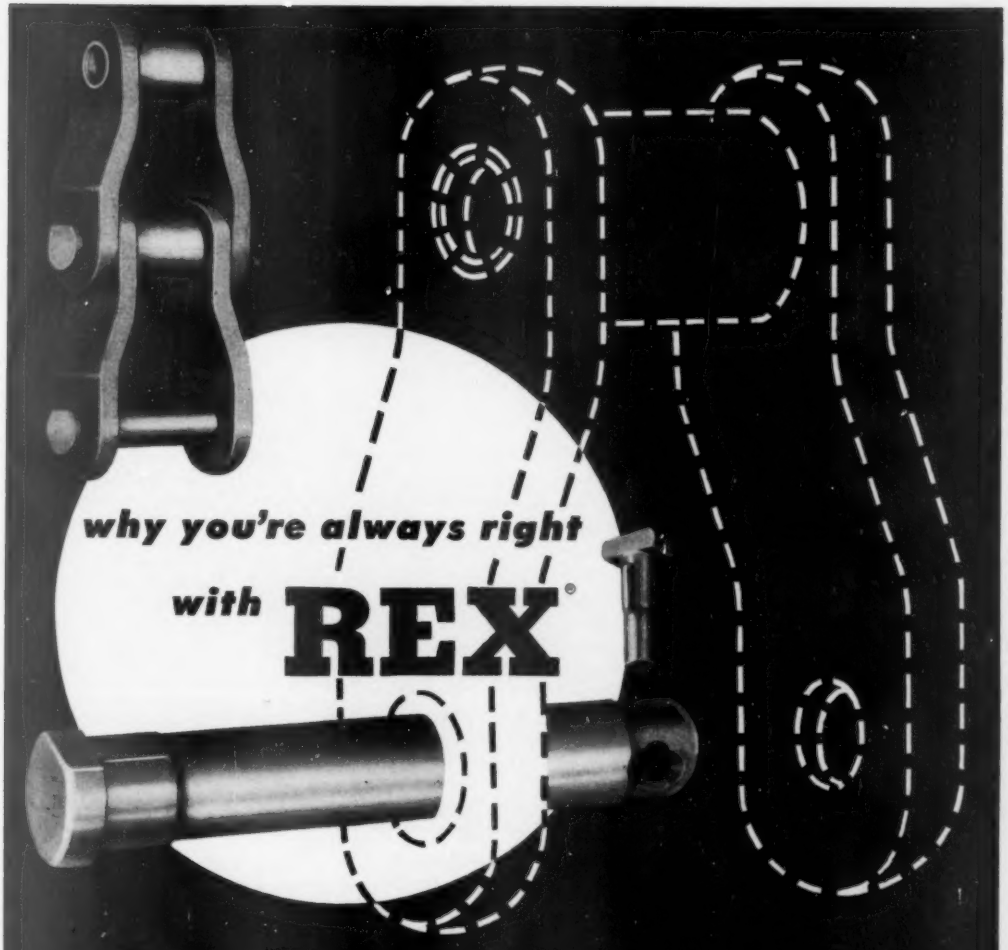
P C&C C

PITTSBURGH COKE & CHEMICAL CO.

Grant Building · Pittsburgh

W&D 4241

COAL CHEMICALS • AGRICULTURAL CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON



the 3-DIAMETER PIN — *for example*

Easy and Safer to Take Apart • Easy and Safer to Reassemble
No Drift Pins Required • Unit Link Construction for Longer Life

REX API CHAINS *"For 40 years the greatest chain that ever hit the oil fields."*

For all the facts, write for Bulletin 51-8

CHAIN BELT REX COMPANY ®

Chain Belt COMPANY
OF MILWAUKEE

4619 W. Greenfield Ave., Milwaukee 1, Wis.

OIL FIELD SALES OFFICES

New York • Tulsa • Dallas • Houston • Midland • Los Angeles

Distributors located in principal cities in the United States and throughout the world

They Say—

Best Is Still to Come

"In the past several years many new sources of oil have been discovered—in North Dakota, Utah, Texas, Canada, Sumatra, Iraq, and Venezuela. In some of these areas exploration had gone on for years without finding oil. In other areas oil production had fallen off, then new horizons were tapped.

"By producing and using oil we have accumulated the means, both financial and technical, to find more oil. We have developed methods for locating and mapping structures with greater speed and accuracy. We can reach deeper strata. As a result, in the United States alone there has been produced since 1938 as much oil as was known to exist in the country at that time. And despite that great withdrawal, the domestic industry's proved resources are at an all-time high.

"New techniques of recovery and refining, improved practices in transport and handling, better consuming devices—all mean that we can get more work out of a barrel of oil than we could previously. And I think we've only begun to use the energy potential in a barrel of oil."

Eugene Holman, president of Standard Oil Co. (N.J.), in an article published in the Atlantic Monthly and condensed in the Reader's Digest.

Why Not Controls

"The fallacy of any plan to control the economy is that, to achieve the effect desired by the planners, production must be regulated and consumption rationed. The people must follow the regulations. Freedom to buy and sell would vitiate the plan.

"By its very nature any plan to control the economy is inflexible and static. Thus the ever-changing needs of man, and the conditions governing his life are ignored. To get around this, new plans without end must be improvised to maintain top control.

"But if the plan must be constantly changed to meet changing conditions, it is not a plan at all, but mere improvision. Therefore, all the planners can accomplish when they attempt to control the economy, is to transfer our competitive markets to the brain trust of the plan."

C. H. Lyons, president of the Independent Petroleum Association of America, addressing the annual meeting of the Kentucky Oil and Gas Association, Lexington, Ky.

Map Reader

Sir:

I have just seen a copy of your map of the Gulf Coast oil fields which you included in your June 16, 1952, issue. It is an excellent job, and I want to compliment you on the work.

As I am in the oil and gas division of the attorney general's office of Texas, I would like to secure two copies of the map for my use in this division, and if you would let me know how much they are I will appreciate it, as they would be very useful and helpful to me.

Dean J. Capp
Assistant Attorney General
Austin, Texas

Duck Pins and Heating Oils

"The Office of Price Stabilization has established ceiling prices on duckpin and tenpin bowling games played within the city limits of Baltimore, Md.

"Last winter there was a shortage of heating oils in New England and along the east coast. At the same time, there was a surplus of these petroleum products in the middle west and midcontinent areas, including Oklahoma,

cooling towers last twice as long with Fluor periodic inspections

● *After 25 years of continuous service, this Cooling Tower at Stauffer Chemical Company, Vernon, California, was completely renovated by Fluor Cooling Tower Repair.*

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At no cost to you, Fluor will inspect to determine repairs necessary to bring it back to original efficiency, will furnish a complete written report, a blueprint and itemized statement of materials needed and will bid for the job competitively.

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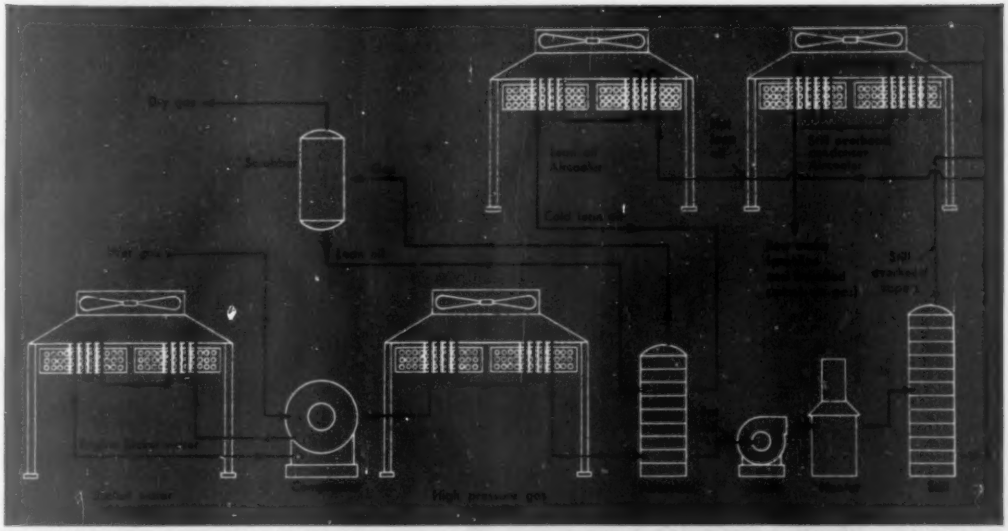
- **condensing overhead vapors**
- **cooling lean oil**



versatile ALCO AIRCOOLERS handle all these cooling duties at natural gasoline plants

ALCO Aircoolers demonstrate their versatility in natural gasoline plants. The simplified flow diagram above shows how Aircoolers are used to cool jacket water, cool high pressure gas, condense overhead vapors and cool lean oil.

The flexibility of ALCO fabricated steel header design also permits handling a number of different fluid streams in one tube bundle. For example, in some installations a single Aircooler may perform both the lean oil cooling and overhead vapor cooling functions.

ALCO Aircoolers are the logical and economical solution to all types of cooling problems where abundant good water is not available. Scale and corrosion troubles are eliminated.

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Kansas, North Texas and Arkansas. Freight rates had been increased so that it was unprofitable for inland refiners to ship heating oils to the east coast by railroad tank cars. The OPS was asked to grant an increase in ceiling prices sufficient to offset the increased costs of transportation. It refused to do so.

"Home owners in the east began to suffer from lack of heating oils. Some oil companies shipped large consignments to the east at a loss to themselves. OPS promised to consider the matter and to make an adjustment in ceiling prices if it decided such adjustment was warranted. Up to this time it has done nothing about last winter's prices on oils.

"OPS was set up under the Defense Production Act to establish price ceilings on products needed in the defense effort to prevent inflationary trends, and to set top prices on critical materials in short supply.

"Now that the extremely vital duckpin matter has been settled, perhaps we can expect some help on keeping the East warm next winter.

"Or is everyone supposed to keep warm bowling?"

Editorial in the Tulsa Tribune.

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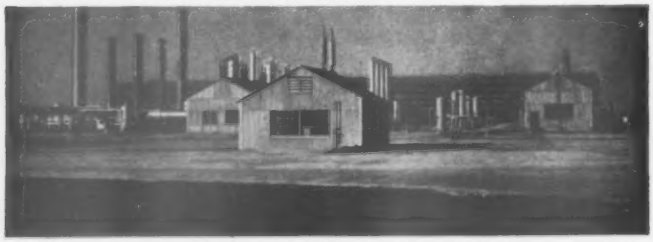

CALENDAR OF EVENTS

JULY

21-25 National Conference on Clays and Clay Technology, University of California, Berkeley.

AUG.

1- 3 Wyoming Geological Association, field trip, Big Horn basin.

11-13 Society of Automotive Engineers, national West Coast meeting, Fairmont Hotel, San Francisco.

18 Illinois Oil & Gas Association and Illinois Basin chapter of American Petroleum Institute, annual mid-summer Oil Men's Outing, Meadow Woods Country Club, Centralia, Ill.

19-22 American Institute of Electrical Engineers, Pacific general meeting, Westward Ho Hotel, Phoenix, Ariz.

25-27 Twelfth Annual Appalachian Gas Measurement Short Course, West Virginia University, Morgantown, W. Va.

SEPT.

1- 3 Interstate Oil Compact Commission, fall meeting, Banff, Canada.

3- 5 Pacific Coast Gas Association, Ambassador Hotel, Los Angeles.

4- 5 Rocky Mountain Oil & Gas Association, refining committee, Newhouse Hotel, Salt Lake City.

8-12 Instrument Society of America, seventh national instrument conference and exhibit, Cleveland.

10-12 National Petroleum Association, fiftieth annual meeting, Hotel Traymore, Atlantic City, N. J.

11-13 American Institute of Chemical Engineers, regional meeting, Palmer House, Chicago.

12-13 Association of Desk and Derrick Clubs of North America, first annual meeting, Shamrock Hotel, Houston.

25-26 Western Petroleum Refiners Association, regional meeting, Hotel Henning, Casper, Wyo.

29-30 American Association of Oilwell Drilling Contractors, annual meeting, Skirvin Hotel, Oklahoma City.

OCT.

1- 3 American Institue of Mining and Metallurgical Engineers, Mid-Continent fall meeting, Rice Hotel, Houston.

1- 3 National Association of Corrosion Engineers, South Central Region, technical program and committee meetings, Jung Hotel, New Orleans.

1- 3 American Institute of Mining and Metallurgical Engineers, Mid-Continent fall meeting, petroleum branch, Rice Hotel, Houston.

2- 3 Petroleum Electric Power Association, twenty-third annual meeting, Mayo Hotel, Tulsa.

4 John Zink Process Heating seminar, John Zink Co. plant, Tulsa.

6 Independent Natural Gas Association of America, annual meeting, Fontenelle Hotel, Omaha, Neb.

9-10 California Natural Gasoline Association, twenty-seventh annual fall meeting, Ambassador Hotel, Los Angeles.

13-15 Texas Mid-Continent Oil and Gas Association, thirty-third annual meeting, Hotel Texas, Fort Worth.

13-17 American Institute of Electrical Engineers, fall meeting, New Orleans.

16-19 Permian Basin Oil Show, Odessa, Tex.

This slush nozzle is the heart of REED Twin-Blast Rock Bits. It makes them the fastest drilling, longest wearing bits ever produced by REED.

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Originators of Coal Tar Tape Protection

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19	Natural Gasoline Association of America, southern regional meeting, Blackstone Hotel, Tyler, Tex.
20-21	Independent Petroleum Association of America, annual meeting, Mayo Hotel, Tulsa.
22-24	Society of Automotive Engineers, national transportation meeting, Hotel William Penn, Pittsburgh, Pa.
22-24	American Institute of Mining and Metallurgical Engineers, West Coast fall meeting, petroleum branch, Statler Hotel, Los Angeles.
23-24	American Institute of Mining and Metallurgical Engineers, West Coast fall meeting, Statler Hotel, Los Angeles.
24-25	Independent Petroleum Association of America, annual membership meeting, Skirvin Hotel, Oklahoma City.
27-31	American Gas Association, annual convention, Atlantic City, N. J.
30-Nov. 1	Rocky Mountain Oil and Gas Association, annual meeting, Cosmopolitan Hotel, Denver.

NOV.

3- 4	Society of Automotive Engineers, national diesel engine meeting, Chase Hotel, (tentative), St. Louis, Mo.
5- 7	Industrial Management Society, 16th annual time and motion study and management clinic, Sheraton Hotel, Chicago.
6- 7	Society of Automotive Engineers, national fuels and lubricants meeting, Mayo Hotel, Tulsa.
6- 8	Gulf Coast Association of Geological Societies, annual fall meeting, Hotel Driscoll, Corpus Christi, Tex.
8-13	Oil Industry Information Committee, Conrad Hilton Hotel, Chicago.
10-13	American Petroleum Institute, thirty-second annual meeting, Conrad Hilton Hotel and Palmer House, Chicago.
13-14	Society of Exploration Geophysicists, midwestern meeting, Texas Hotel, Fort Worth.
20-22	Instrument Maintenance Short Course, jointly sponsored by Southern California Meter Association and Los Angeles Harbor Junior College.
30-Dec. 5	American Society of Mechanical Engineers, Statler Hotel, New York City.

DEC.

1- 6	Twentieth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York.
5- 6	Interstate Oil Compact Commission, winter meeting, Wichita, Kans.
7	Natural Gasoline Association of America, Panhandle-Plains regional meeting, Herring Hotel, Amarillo, Tex.
7-10	American Institute of Chemical Engineers, annual meeting, Hotel Cleveland (Hqs.) and Carter Hotel, Cleveland.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month, Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

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Under the most adverse conditions, Mission engineers have proved beyond any doubt that Mission E-Z Swabs are far superior to any other swab ever before made available to the oil industry. Performance runs have proved that Mission E-Z Swabs practically eliminate line breakage, eliminate junk in tubing, control the amount of fluid lifted and give longer trouble-free life. Specify Mission E-Z Swabs at your supply store. *If Mission E-Z Swabs do not prove more satisfactory in comparative tests than the make you are now using, the entire purchase price will be promptly refunded.*

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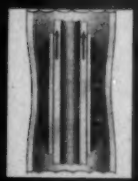
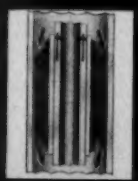
On the down stroke fins are in normal returned position, allowing E-Z Swab to fall free.

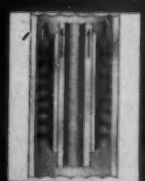
Flexibility of fins allows EZ Swab to pass smoothly through tight spots on up or down stroke.





E-Z Swabs automatically by-pass fluid overload. Each rubber will lift approximately 400 feet of fluid. Rubber fins bend down and unload excess fluid.

After overload fluid is passed, fins spring up and seal against tubing.



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THE OIL AND GAS
JOURNAL
TULSA, OKLAHOMA

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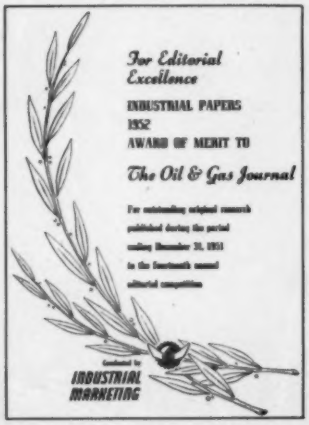


Outstanding Research

PERHAPS you recall seeing an illustration like this last year; or the year before. This is the seventh consecutive time that our favorite oil publication has won an award of merit for editorial achievement in the annual contest for business publications conducted by Industrial Marketing magazine.

Maybe it's getting to be a habit, but it's a mighty pleasant habit, and it gives the editors a lot of pride to be informed that we have still another plaque to hang in our trophy room.

This year's award was for "outstanding original research among industrial publications," and it was won by the annual "Review and Forecast" issue of January 25, 1951.

This should be no surprise to our readers, for all of you (except, perhaps, those who joined the family in recent months) must realize how much original research we put into that big statistical job every January. It's chock full of figures you won't find anywhere else, and others that we get to you weeks or months before any other source. This means that we have to dig them out ourselves.

For many years we have been well aware that the Review and Forecast involved a whale of a lot of "outstanding original research," and most of our readers were aware of it, too. It's very gratifying to know that our efforts have received wider recognition and that the whole publishing fraternity is now aware of it also.

Incidentally, our Midyear Review and Outlook issue will be out July 28, and while it won't have as much detail as the January opus it will be a good check on where we are at and whither we are trending. And right after that we start planning for the big annual due 6 months later, and we're determined to make it, too, worthy of a prize.

Hot Cockroaches

GULF OIL CORP. is now breeding radioactive cockroaches—as if the ordinary kind weren't bad enough.

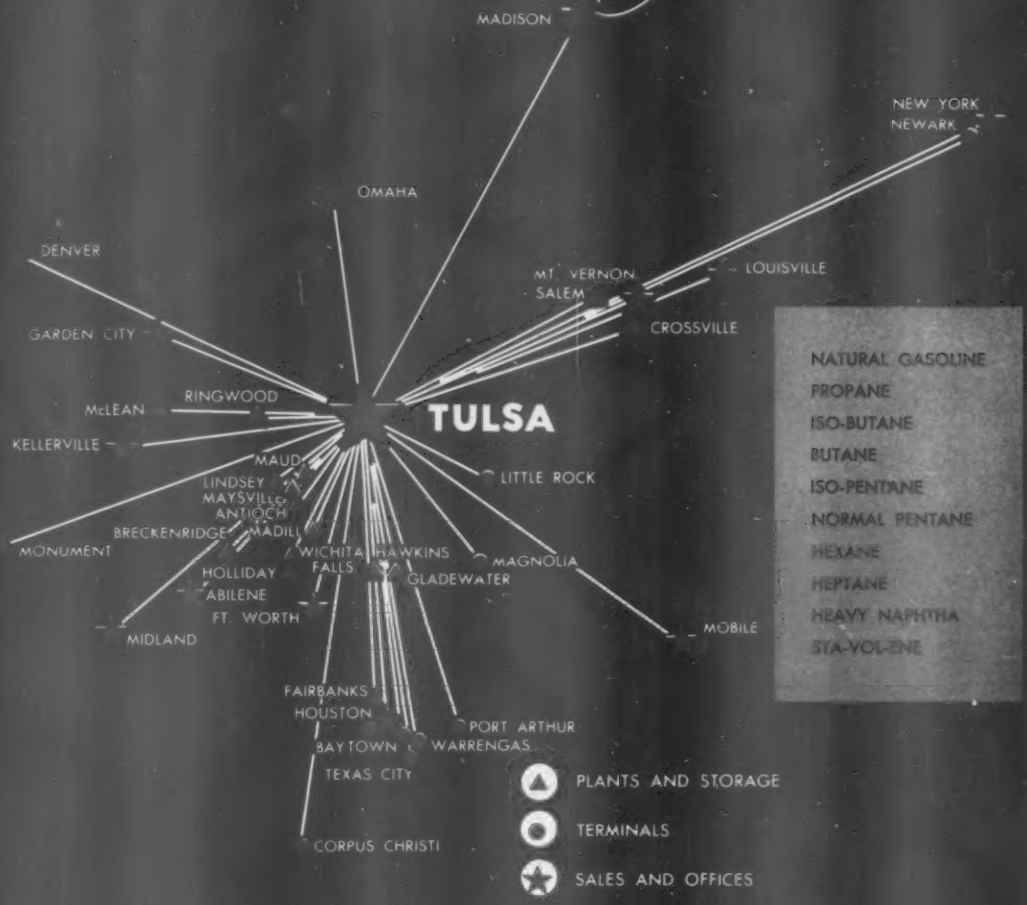
We hasten to explain that these "hot" cockroaches are not an attempt to combine biologic and atomic warfare, as the Russians falsely accuse us of doing in Korea. They are being raised purely for research purposes and they cost so much that only a few broods will be produced and they won't be turned loose in anybody's kitchen.

It seems that in trying to make new and better insecticides, Gulf was stymied by lack of knowledge of just how poisons kill bugs. So Gulf researchers are preparing an insecticide containing some radioactive molecules. They feed this to cockroaches. The cockroaches die. A post mortem is conducted. By means of the radioactive tracers, the scientists hope to find out what different kinds of poisons do to a bug's innards. Armed with this basic information, they expect to be able to produce even more effective bug killers.

What's all this have to do with petroleum? Why, if Gulf can make a better bug killer it can sell it at a profit and use the money (after taxes) to find new oil so the country won't run out of it and have to fall back on government plants to produce oil from coal. And, incidentally, it demonstrates how the oil industry is always working to develop new products for the benefit of man and the detriment of bugs.

Henry D. Ralph

Service Extra



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BUTANE
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HEXANE
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WARREN

PETROLEUM CORPORATION

TULSA, OKLAHOMA CABLE ADDRESS: Standard Warren

Here's one government oil report that makes sense

ONE of the most realistic documents on petroleum ever made by an agency of the federal Government undoubtedly is the report just issued by the President's Materials Policy Commission.

It may well guide government policy for years to come. The industry can wholeheartedly endorse its method of approach and its major conclusions, though some segments may disagree with some of the details.

The commission, composed entirely of nongovernment men, was charged with taking an objective, long-range look at the nation's future supplies of minerals of all kinds. It concluded that we are fast using up most of our minerals and that at varying times within the next generation or two we may be seriously short of many of them.

BUT unlike many previous minerals-policy reports by federal agencies, this Paley report has no ax to grind. It asks no new or extraordinary powers for the federal Government. It does not raise alarm that "we're running out of oil". Its recommendations rely, for the most part, on the traditional operations of private industry and economic factors.

It is chiefly in degree and timing that this report differs from long-range forecasts and policy statements of the petroleum industry. For example, the National Petroleum Council's McCollum report on crude availability may be a bit more optimistic on the size of new discoveries which will be made by some future date, but both are in the realm of speculation and the general conclusions are similar.

Synthetic fuels, the Paley group feels, may be needed as a supplement a few years before the industry as a whole thinks they will be necessary, but the government aid recommended is not large and not particularly injurious to crude producers.

Crude imports, says the report, should be fostered by tariff reductions to the point where they do not impair the efficiency of the domestic industry—a rational long-range policy though the timing of its application may bring disputes.

ON tidelands, conservation policies, "sterilized" Naval petroleum reserves, fuels prices, natural-gas regulation, significance of proven reserves, tax incentives, factors influencing future discovery and recovery, and most other problems of the petroleum industry, the Paley report adopts the industry's viewpoint in all essential features.

The Paley group has done a great service to the petroleum industry, to the nation, and to perpetuation of the American way of life. Its report will be studied closely and quoted widely by the industry. The conclusion probably will be that here at last is one government report which the industry, by and large, can accept as a sensible outline of general policy.

Anchor's Growth

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It takes something on the ball for a company to become a leader in a few years — in Anchor's case that something is superior service. Our specialty in marketing petroleum products plus our fast and efficient service to customers have made Anchor's growth outstanding in the petroleum products field. You can benefit from this superior service whether you are buying or selling petroleum products — Call Anchor First!

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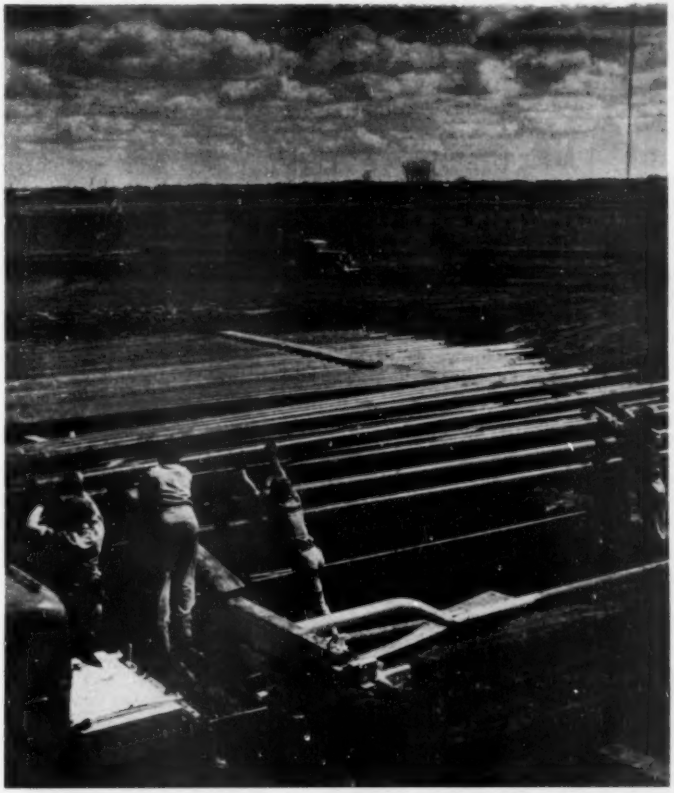
ANCHOR

PETROLEUM COMPANY TULSA

THIS WEEK

INDUSTRY.—Capital expenditures of oil industry this year expected to total 4 billion dollars, 25 per cent more than 1951 and the biggest outlay in history. . . . Production operations to take biggest chunk, with more than 2 billion allocated for this division. . . . ¶Foree tells equipment manufacturers oil industry will drill 60,000 wells in 1954 and 65,000 in 1955 if tubular goods are available. . . . Big program needed, he says, to give nation anything like the reserve producing capacity it had at the beginning of World War II. . . . Increased number of wells and increasing depth of average wells means a need for tremendous amounts of casing and tubing. . . . ¶Sinclair reaches agreement with union on terms of new 1-year nation-wide labor contract. . . . Closed shop not included. . . . New provisions allow 15-cent hourly wage increase, higher traveling allowance, sick benefits, and hospitalization allowances. . . .

INTERNATIONAL.—First pipe now en route for 24-in. crude-oil line of Basrah Petroleum from Zubair to Fao. . . . Line is part of expansion program under which Basrah's production will be increased to 160,000 bbl. daily by end of 1955. . . . ¶Former Pemex counsel charges percentage-of-production contracts with U. S. operators violate Mexican constitution. . . . View is that held by some major companies since contracts first were signed in 1949. . . . Pemex asks formal investigation by Mexico's attorney-general. . . . ¶Standard-Vacuum lets contract for construction of 25,000-bbl. refinery at Bombay, India. . . . ¶Shell of Australia announces plans to build 24,000-bbl. refinery near Melbourne, Australia. . . . Original plans were for 16,500-bbl. refinery.



SUPPLIES OF TUBULAR GOODS for drilling operations had dwindled last week to the point where many operators were faced with the prospect of stacking their rigs. The industry was told it loses enough casing, tubing, and drill pipe to drill 110 wells every day the steel mills remain closed. A widespread slowdown in drilling activity was in immediate prospect, and there were fears that nearly 1,000 rigs would be stacked if the strike should continue another month.

ACTIVITY.—Production of crude and lease condensate averaged 6,164,325 bbl. daily for week ended June 28, up 4,650 bbl. daily. . . . Total wells completions for the week amounted to 931 compared with 937 for previous week and 924 for same week last year. . . . Wildcat completions increased 14 wells to 197. . . .

TRENDS.—The number of rotary rigs operating in United States on June 30 was 225 less than at the first of the year. . . . The total of 2,673 on June 30 represented a decrease of 161 rigs in 2 weeks. . . . Operating rigs now are only 101 more than last year compared with a margin of 723 early in January. . . .

MATERIALS.—Continuation of steel strike to have drastic effects on oil industry. . . . Loss of tubular goods means stacking of drilling rigs because of lack of tubing and casing. . . . Pipe-line and refining operations little affected yet, but future construction programs to feel pinch even with early settlement of strike. . . . Completion dates of refineries now building expected to be moved ahead as supply situation worsens. . . .

REFINING.—Suntide begins preliminary work on 134-acre site near Corpus Christi where it will build its new 25,000-bbl. refinery. . . . Completion scheduled for late 1953, with cost estimated at more than $15,000,000. . . . ¶All certificates for accelerated tax amortization issued through April would add 1,289,492 bbl. daily to nation's crude-throughput capacity, PAD says. . . . Report shows small refiners making more of the opportunity than majors.

NATURAL GAS.—President's Materials Policy Commission sees consumption in 1975 of 15 trillion cubic feet, but warns that eventual shift to other fuels is inevitable. . . . What the industry must do, the commission says, is to encourage maximum economic discovery and recovery, derive the greatest economic advantage from gas while it lasts, and minimize the costs and dislocations of the switch to other fuels when it becomes necessary. . . .

Steel Strike Hurting

Shutdown is lopping 110 wells daily from completions in 1952-53; effects soon to be felt by refiners, pipe liners

Henry D. Ralph

THE steel strike is beginning to have serious effects on operations in the oil industry.

The shortage of steel is showing up first in oil-country tubular goods. In many parts of the country drilling rigs are being stacked for lack of casing and tubing. The pace of the shutdown is getting faster, and within a few weeks a large portion of the nation's rigs may be idle.

Other branches of the industry have not been hard hit as yet, but they will feel the delayed impact of the steel strike next month or next quarter. Some pipe-line construction projects may be out of pipe within a week or 10 days. Erection of refineries and natural-gasoline plants is continuing, but in time these projects will be overtaken by the lag between basic steel production and delivery at construction sites.

Every day of the steel strike (it started June 2) cuts 110 wells off the expected total completions in 1952-53, J. Ed Warren, deputy administrator of the Petroleum Administration for Defense, said in Washington.

Warren said each day the strike continues means a loss of 5,000 tons of oil-country tubular goods, enough to support a program of drilling 3,400 wells a month.

Pessimistic forecast . . . This serious effect is not apparent yet in completion figures. Operators have been drilling wells on their inventories of casing, have been depleting stocks of supply stores, and have been using as much secondhand and foreign goods as they can lay hands on.

Last week drilling began grinding to a stop. The latest report shows that the number of active rigs has declined 150 in 2 weeks. A faster decline is generally expected during the next 2 weeks. Within a month, the American Association of Oilwell Drilling Contractors predicts, 600 or 800 rigs will be idle. Some operators are even more pessimistic.

The casing shortage varies with regions and among individual operators. West Texas and the Gulf Coast are the hardest hit. Some large companies have cut their drilling wells by one-third and are faced with still further curtailment if they cannot get more tubular goods soon.

Even operators who have not had to curtail drilling yet are tailoring their future programs. They are scheduling only those wells required by immediate lease obligations or those which are rather certain to yield a high return of oil per ton of steel used. Operators generally are making tentative downward revisions in their drilling programs for the third quarter. Many state agencies report a big decline in routine applications for drilling permits.

Reserves gone . . . Supply stores quite generally report that their stocks of tubular goods are entirely depleted. They say practically all their drilling-contractor customers are feeling the pinch and the situation gets worse momentarily. They have sucker rods, wire rope, and most other items except line pipe, but they expect a falling off in shipments from fabricators of these items before long.

Early settlement of the steel strike will not help the drilling situation immediately. It will take a week or more for the basic steel mills to reach maximum production, and there will be another lag before steel billets start coming out of rolling mills as finished tubular goods.

And there is no assurance that the oil industry will get the same percentage of steel output it got before the strike. The military or other claimant agencies may outbid the Petroleum Administration for Defense for the lion's share of the first few weeks' output because of emergency pleas.

PAD is now completing a survey of the effects of the steel strike on various programs of the oil and gas industry. It may have to recall steel allocated to certain pipe lines in order to get others completed before winter or to tie in with other projects on schedule. The scheduled completion dates for some refineries undoubtedly will have to be moved from the third to the fourth quarter, and from the fourth quarter to next year. PAD's program for 80,000 wells in the next 18 months may have to be revised downward.

Refiners' outlook . . . Refinery constructors and fabricators of refining equipment have not suffered much as yet because they have been working on material on hand or en route when the strike began, but they anticipate trouble before long. One of the shortest items is structural steel, necessary for the erection of refinery vessels.

Drilling contractors operating on the Gulf Coast and in West Texas are particularly pessimistic. Some say that within 2 weeks there will be a thousand rigs stacked. They note a marked falling off in the number of requests for bids to drill on new locations, and say that many majors are attempting to keep their own rigs operating with stocks of tubular goods on hand and are making few new contracts or farmout deals.

Even contractors who still have all their rigs running say that the outlook is dismal. Several said they look forward to about one more well per rig, and then a wait until casing starts coming from the rolling mills again.

Sinclair, O.W.I.U. Agree

NEW YORK. — Sinclair Oil Corp. and the Oil Workers International Union reached agreement here July 1 on terms of a new 1-year labor contract covering approximately 10,000 Sinclair employes.

A Sinclair official said the new contract provided for increased moving and traveling expenses for production and pipe-line employes, extended sick benefits varying with years of service, and increased hospitalization and surgical plan allowances. The union request for a closed shop was denied, and no changes were made in vacation time.

Wages were not at issue in the negotiations. A 15-cent an hour increase was granted in May to end the strike. When that wage offer was accepted the escalator clause in the old Sinclair contract, linking wage increases to the government cost-of-living index, was dropped.

Sinclair is the only one of the larger companies in the industry with a national contract. The settlement followed about 3 weeks of negotiations.

Oil Progress Week Set

NEW YORK.—Oil Progress Week—this time when the petroleum industry concentrates its efforts to give the public a better understanding of the petroleum industry—will be observed this year, October 12-18, inclusive.

This will be the fifth observance of the week, sponsored by the Oil Industry Information Committee of the American Petroleum Institute.

Theme of the 1952 observance is based on the advancement in gasoline quality during the past 25 years. Slogan for the year's event is "Two equals three," suggesting that 2 gal. of gasoline manufactured today is equivalent in work-energy to 3 gal. produced in 1925.

Activity during the week will feature talks by oil men at civic functions, open houses at oil installations, radio and television broadcasts devoted to oil.

More Drilling Needed

Foree sets goal of 60,000 wells in 1954, plus an annual increase of 5,000 after that; it can be achieved, he says

SAN FRANCISCO.—The oil industry needs to drill 60,000 wells in the United States in 1954 and 65,000 in 1955, and it will drill that many if tubular goods can be obtained.

These predictions were made to the annual meeting of the Petroleum Equipment Suppliers Association here by Robert L. Foree, director of the production division of the Petroleum Administration for Defense.

We need such a huge drilling program if we are to approach having the same percentage of reserve productive capacity that we had at the beginning of World War II, Foree said. The program is a projection of the same type of calculating that led to PAD's present goals of 25,000 wells the last half of 1952 and 55,000 wells during 1953.

Reserve is gone . . . In 1940 the industry had a reserve capacity to produce more than 1,000,000 bbl. per day above domestic consumption then, a reserve of 34 per cent.

This reserve was wiped out during the war, and it was not until 1949 that we restored any reserve capacity. This reserve has not increased appreciably since then because of increases in consumption and shortages of materials, Foree explained.

Looking ahead at the forecasts of production and consumption, PAD estimates that if we drill 60,000 wells in 1954 we will have a productive capacity of only 17.8 per cent above the estimated consumption. The suggested 65,000 wells in 1955 would still leave us short of the 34 per cent reserve capacity we had in 1940.

The industry will drill this many wells because of its record of performance in the past, Foree declared. For example, in 1947 it drilled 33,122 wells but in 1948 it drilled 39,778—an increase of 6,656 wells in a single year. By contrast, PAD's future goals call for an increase of 5,000 wells each year over the previous year.

What is involved . . . Figuring that the average depth of wells will increase 100 ft. per year, and using a factor of 11 tons per 1,000 ft. adjusted for depth, PAD makes these forecasts of the demand for casing and tubing: 2,184,000 tons in 1952; 2,643,000 tons in 1953; 2,750,000 tons in 1954; just over 3,000,000 tons in 1955. These figures do not include drill pipe.

"That sounds enormous," said Foree, "but the demands for crude oil would also be enormous in an all-out war."

Current conditions indicate that this program can be achieved, he added. During the last half of 1951 the industry drilled 23,750 wells, which is only 1,250 fewer than PAD's goal for the last half of 1952. During the first 5 months of 1952 operators drilled 15,221 wells, or 2,119 more than they drilled in the corresponding period of last year

"If this 16 per cent increase over 1951 continues with the usual seasonal trends in drilling, 1952 actually will see the drilling of slightly more than 50,000 wells in the year," Foree said.

The industry's determination to step up drilling is also shown in the fact that operators keep asking PAD for more tubular goods than is available. Many operators report declining inventories, some are using secondhand or foreign pipe for as much as 25 or 35 per cent of their needs, and there is still a heavy program of converting steel from other forms to tubular goods by means of individual contracts.

New officers . . . New officers of P.E.S.A. elected at the San Francisco meeting were: Mason Jones, S. M. Jones Co., Toledo, president; D. D. Bovaird, Bovaird Supply Co., Tulsa, vice president; H. R. Safford, Jr., Houston, executive secretary.

Four new directors at large were elected: J. L. Shakely, Jones & Laughlin Supply Co., Tulsa; Fred M. Mayer, Continental Supply Co., Dallas; J. A. Crawford, Youngstown Steel Products Co., Los Angeles; E. S. Dulin, Byron Jackson Co., Los Angeles. Other directors for 1952-53 are:

. . . Eastern district: George H. Alten, Alten Foundry & Machine Works, Inc., Lancaster, Ohio; Karl Elliott, Acme Fishing Co., Parkersburg, W.

Not Like a Ship Launching But . . .

This is one pipe liner's idea of how a record-setting pipe-line-construction job should be finished. Raymond H. Crowe, chief engineer of Transcontinental Gas Pipe Line Corp., prepares to shatter the traditional bottle of champagne as the company completed its difficult crossing of the Narrows of New York Harbor. At left is Victor Galucci, of Samuel Galucci & Sons, Inc., Long Island, and at right Sammy Collins, of Collins Construction Co. of Texas, the two firms which contracted the crossing. The crossing gave the New York area its second inlet for the 250,000,000 cu. ft. of natural gas it receives daily from Transcontinental. The crossing, made with 24-in. pipe, was 6,600 ft. long. With a maximum depth of more than 100 ft., the crossing is the deepest in the country. Crowe directed operations at the site for Transcontinental. The pipe, covered with 3 in. of Somastic coating and Hevicote concrete jacketing, rests in a trench 25 ft. deep below the bed of the Narrows.

Va.; Jene Harper, Franklin Supply Co., Chicago; Mason B. Jones, S. M. Jones Co., Toledo; Lloyd Lamphere, Ajax Iron Works, Corry, Pa.; A. S. Knowles, Parkersburg Rig & Reel Co., Parkersburg, W. Va.; I. B. O'Connor, Clark Bros. Division, Dresser Industries, Inc., Dallas; Donald W. Mackie, Bradford Supply Co., Bradford, Pa.; Frederick F. Murray, Oil Well Supply Co., Dallas; A. W. McKinney, National Supply Co., Toledo; Fred J. Spang, Spang & Co., Butler, Pa.; and H. Bernard Wehrle, McJunkin Supply Co., Charleston, Va.

. . . **Pacific district:** J. C. Axelson, Axelson Manufacturing Co., Vernon Branch, Los Angeles; Markley C. Brown, Hillman-Kelly, Los Angeles; Rodney S. Durkee, Lane-Wells Co., Los Angeles; J. L. Evans, National Supply Co., Los Angeles; Don Grubbs, Oil Well Supply Co., Los Angeles; Otto Hammer, Security Engineering Co., Whittier, Calif.; Harold Howard, Howard Supply Co., Los Angeles; Wendell Jones, Bethlehem Supply Co., Los Angeles; John J. Pike, Jr., Republic Supply Co. of California, Los Angeles; W. T. Powell, Emsco Derrick & Equipment Co., Los Angeles; Edgar Spear, Chiksan Co., Brea, Calif.; and Ted Sutter, Baker Oil Tools, Inc., Los Angeles.

. . . **Mid-Continent and Rocky Mountain district:** Frank E. Bernsen, Lucey Products Corp., Tulsa; E. C. Bolger, W. C. Norris, Manufacturer, Inc., Tulsa; Davis D. Bovaird, Bovaird Supply Co., Tulsa; S. J. Iverson, Iverson Supply Co., Fort Worth; Grover Kilgore, Halliburton Oil Well Cementing Co., Duncan, Okla.; W. H. Larkin, Larkin Packer Co., St. Louis; M. G. McCool, American Iron & Machine Works Co., Oklahoma City; Walter O'Bannon, Walter O'Bannon Co., Tulsa; John Staudt, Dowell Incorporated, Tulsa; Guy A. Tompson, Bethlehem Supply Co., Tulsa; S. P. Wallace, Maloney-Crawford Tank & Manufacturing Co., Tulsa; and Carl White, Franks Manufacturing Co., Tulsa.

. . . **Southwestern district:** W. T. Campbell, Mission Manufacturing Co., Houston; Ken W. Davis, Mid-Continent Supply Co., Fort Worth; H. E. Childs, Western Co., Midland, Tex.; R. G. Hamaker, Reed Roller Bit Co., Houston; Frank Hereford, Murray-Brooks, Inc., Lake Charles, La.; Elliott Johnson, Schlumberger Well Surveying Corp., Houston, J. H. Lollar, Jr., Republic Supply Co., Houston; M. E. Montrose, Hughes Tool Co., Houston; Ralph Neuhaus, Cameron Iron Works, Houston; George O'Leary, Houston Oil Field Materials Co., Houston; Charles Thornhill, Thornhill-Craver Co., Houston; Walter Trout, Lufkin Foundry & Machine Co., Lufkin, Tex.; and Wallace D. Wilson, Wilson Supply Co., Houston.

Spending Still Rising

Oil's capital expenditures this year will run 25 per cent above those of 1951, A.P.I. says; production to get most

NEW YORK.—The American oil industry is spending 4 billion dollars in capital expenditures during 1952—far more than during any other year in history.

This is the report of the American Petroleum Institute, which makes an annual survey of the industry's capital spending for new facilities. The 1952 figure of $4,085,762,000 is about 25 per cent greater than last year's capital investment of $3,270,000,000. The total is considered conservative because no information was received from thousands of independent operators.

The total includes $464,003,000 being spent by American oil companies for operations in foreign countries. As shown in the accompanying table, the domestic expenditures are divided among the major divisions of the industry in this fashion.

. . . **Production**—for leases, drilling wells, producing equipment, and natural-gasoline and cycling plants, $2,111,720,000.

. . . **Transportation** — for crude-oil, products, and natural-gas pipe lines and for marine, rail, and highway transport equipment, $547,502,000. The gas lines are those to be laid by oil companies.

. . . **Refining**—for building new and for modernizing and enlarging existing refineries, $565,740,000, plus $66,350,000 for petrochemical plants.

. . . **Marketing**—for bulk plants, terminals, filling stations, and other distribution facilities, $288,950,000.

Nearly every item in the domestic budget is up considerably over last year's spending. Exceptions include leases and overhead transportation equipment. The item for tankers—$104,080,000—is nearly four times last year's.

This is a crude-oil pipe line year; $281,330,000 is being spent for such

OIL INDUSTRY CAPITAL EXPENDITURES IN 1952, 1951, AND 1946-50
(In thousands of dollars)

	Estimated 1952*		Actual 1951*		Actual 1946-1950*	
Production:	United States	Foreign	United States	Foreign	United States	Foreign
Crude oil:						
A. Leases	250,180	23,140	288,850	12,200	1,110,170	84,630
B. Wells and equipment†	1,675,270	289,530	1,469,170	203,400	4,357,620	937,740
Natural gas:						
A. Leases	11,340		15,790	80	36,600	150
B. Wells and equipment†	53,950	1,080	49,660	2,620	159,970	4,360
Natural gasoline and cycling plants	82,170	4,900	52,690		318,760	280
All other	38,810	4,290	37,160	10,480	119,830	65,970
Total production	2,111,720	322,940	1,913,320	228,780	6,102,950	1,093,130
Transportation:						
Pipe lines:						
Crude-oil lines	281,330	40,750	163,050	15,060	531,110	100,530
Product lines	71,590		86,070		222,390	
Natural-gas lines	47,482	1,290	35,581	10,470	84,382	410
Marine:						
Tankers	104,080	5,360	27,650	16,610	390,610	90,880
Barges	8,280		10,910		22,940	150
Others	7,530		8,770		21,660	60
Tank cars	15,550		20,210		59,100	40
Motor transport	7,500		13,450	250	58,300	1,840
All other	4,160	120	24,110	320	28,990	1,300
Total transportation	547,502	47,520	389,801	42,710	1,419,482	195,210
Refining	565,740	49,460	302,950	24,480	1,792,670	228,840
Fertilizer and chemical plants	66,350		24,770		113,790	
Marketing	288,950	38,860	267,690	25,700	1,091,710	118,310
Other	41,497	5,223	49,297	1,461	214,558	6,396
Grand total	3,621,759	464,003	2,947,828	323,131	10,735,160	1,641,886
	(4,085,762)		(3,270,959)		(12,377,046)	

*Figures on foreign capital expenditures include those made for consolidated subsidiaries only. †Includes expenditures for intangible development cost of producing wells and dry holes whether capitalized or charged to earnings.

lines. The item for products lines ($71,590,000) is a little under 1951, but natural-gas lines by oil companies, estimated at $47,482,000, are a much heavier item than last year.

Petrochemical plants costing $66,350,000 are taking nearly three times the amount of money spent for them last year. Refinery expansion at $565,740,000 stands more than half again as high as the 1951 expenditure.

The producing end of the industry, as usual, requires more than half of the total capital expenditures. More than a billion and a half will be spent this year for geological and exploration work, drilling wells, and installing producing equipment.

Elk City Unit Enlarged

OKLAHOMA CITY.—The Elk City unit enlargement case was terminated last week here when the Corporation Commission of Oklahoma ordered enlargement of the Elk City Unit on an allocation basis of 50 per cent to hydrocarbon space and 50 per cent to acreage.

This unitization-participation formula would apply to addition of 95 wells on 3,800 acres, increasing size of the unit to a total of 201 wells on 8,040 acres. Wells are drilled on a regular spacing pattern of 40 acres per unit.

The order also called for a reduction of the produced gas-oil ratio from 3,000 to 2,000 cu. ft. per barrel of oil to wells located outside of the limits of the original unit.

The order must be ratified by 63 per cent of the operators and royalty owners to become effective under the state unitization law.

Originally, Shell Oil Co. and other operators recommended to the commission an allocation formula based on 90 per cent to hydrocarbon space and 10 per cent to acreage. Finally, Shell, United Carbon Co. and others submitted a compromise proposal which would allocate 70 per cent of the allowable to hydrocarbon space and 30 per cent to acreage.

Industry Briefs

SEAL BEACH, Calif. —Seal Beach's city attorney last week was directed by the city council to apply to the state for title to the 3-mile strip of tidelands on the city's ocean front. Seal Beach is one of the few California coastal cities which does not hold title to the tidelands bordering it.

LOS ANGELES.—Belridge Oil Co. is not subject to Los Angeles' privilege tax of 40 cents per $1,000 of gross receipts, Superior Judge Roy L. Herndon has ruled. The court ruled that while the company's main office in located in Los Angeles, its income comes from oil produced in Kern County and delivered to buyers there. The decision is expected to be appealed.

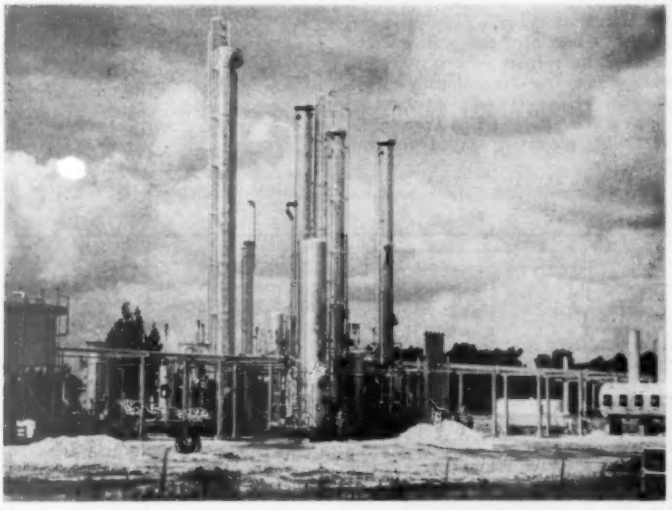
CALGARY, Alta. — Four Canadian oil companies have formed Hartco Oil Co. to enter Williston basin oil operations. The new firm is owned by Royalite Oil Co., Ltd.; Home Oil Co., Ltd.; Triad Oil Co., Ltd.; and Anglo-Canadian Oil Co., Ltd., each of which has a 25 per cent interest. The new company has acquired about 60,000 acres in Montana and is planning to expand its holdings.

TOLEDO. — Acquisition of a controlling interest in Hickok Oil Corp. by Pure Oil Co. and plans to merge the company with Pure Oil Products Co. of Ohio were approved here last week by Lucas County Probate Court. The plans were proposed by executors of the estate of Arthur S. Hickok in order to obtain funds with which to liquidate estate debts. Hickok Oil distributes Pure products in Ohio and Michigan.

WICHITA.—Kansas' July allowable has been set at 310,000 bbl. daily, including 20,000 bbl. being allowed for underproduction in May due to the oil strike. Nominations totaled 319,742 bbl. daily, 10,000 bbl. more than the allowable but 10,000 bbl. under the Bureau of Mines demand forecast of 330,000 bbl. daily.

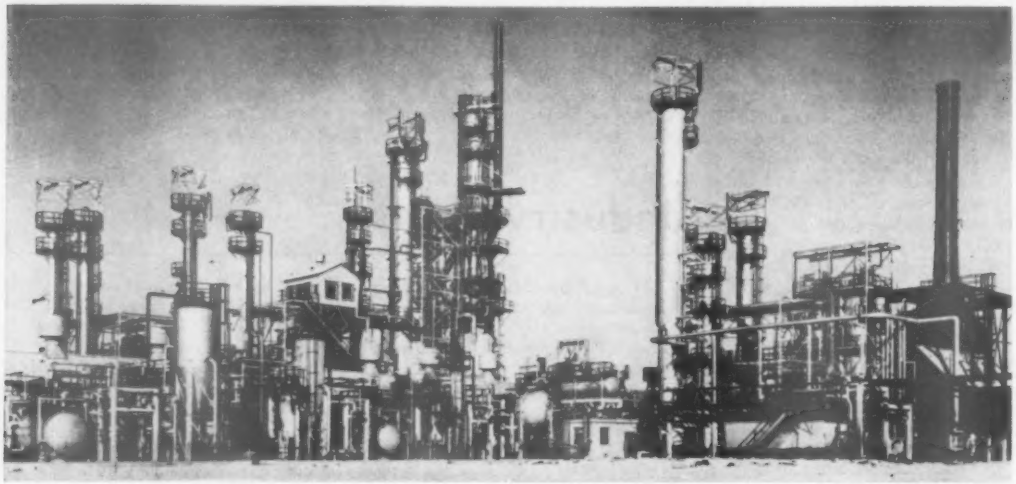
OKLAHOMA CITY.—The Oklahoma Corporation Commission has set the state's July allowable at 487,521 bbl. daily, the same as June. However, the commission will permit additional production between 25,000 and 30,000 bbl. daily to make up for production lost during the oil strike in May. Nominations totaled 514,511 bbl. daily, compared with the Bureau of Mines' forecast of demand of 550,000 bbl. daily.

WASHINGTON.—Walter L. Keefe, a veteran oil man with service in Mexico and Venezuela, has been named head of the foreign-production division of the Petroleum Administration for Defense. He succeeds William Farrand, who is returning to The Texas Co. as general manager of foreign production.



Skid-Mounted Natural-Gasoline Plant

A fully automatic, packaged gasoline plant which can be operated by one man is this one installed by Bel Oil Corp. 30 miles north of Lake Charles, La., near Elton. Units such as this are expected to make natural-gasoline operations economically feasible for small operators. This plant processes 12,000,000 cu. ft. of natural gas and produces 18,300 gal. of liquid products daily. An engineering article on this new plant will appear in an early issue of The Oil and Gas Journal.



SMALL BUT MODERN refinery has this compact arrangement. From the left may be seen the debutanizer, depropanizer, stabilizer, absorber, side-stream stripper of the catalytic fractionator, catalytic unit fractionator, catalytic unit, crude-unit fractionator, crude fractionator side-stream strippers, delayed coker fractionator, coking drums, and combination crude-coker furnace.

Modern Refinery

Facilities in new Edmonton refinery of McColl-Frontenac make it one of most modern plants of its size in world

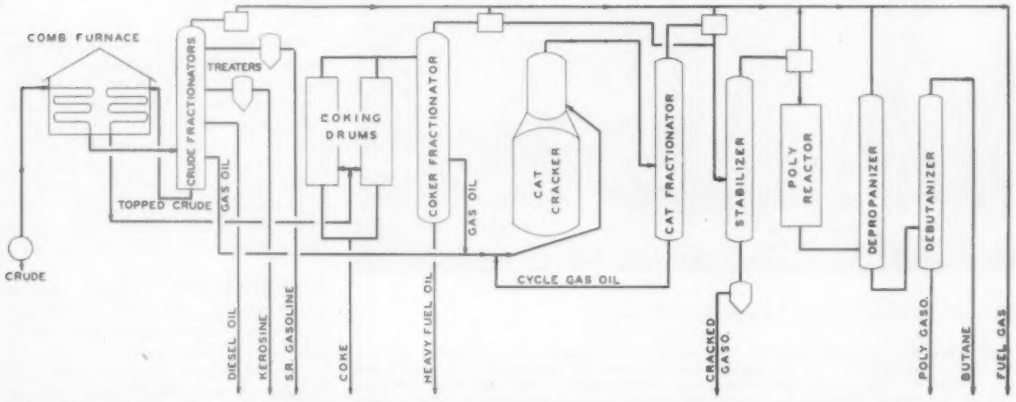
George Weber

EDMONTON, Alta.—Fluid catalytic cracking, delayed coking and catalytic polymerization combine to make the new 5,500-bbl. per day Edmonton refinery of McColl-Frontenac Oil Co., Ltd., one of the world's most modern plants of its size.

Designed and constructed by Foster Wheeler, Ltd., the new plant produces a high yield of light and middle-distillate fuels from Alberta's Wizard Lake crude. As the company's first plant in western Canada, it augments operations at McColl-Frontenac's 40,000-bbl. per day refinery at Montreal East.

The compact installation includes nine processing units. Desalted, preheated crude is charged to the atmospheric crude distillation section of the combination crude-coker furnace, a direct-fired horizontal tubular heater. Gas, gasoline, kerosine, and diesel-fuel straightrun cuts are taken from the primary fractionator for finished product blending, while gas oil and reduced crude are cracked.

Atmospheric crude bottoms are charged directly to the combination furnace for delayed coking, producing a 21.7 per cent yield of thermally cracked gas and gasoline. Thermal gas oil is combined with straightrun gas oil for catalytic cracking, and heavy ther-



FLOW DIAGRAM shows how the combination of nine process units in McColl-Frontenac's new Edmonton refinery will produce a full line of fuel products with emphasis on a maximum yield of high-octane gasoline.

mally cracked fuel can be withdrawn as product. The coke drums, equipped with mechanically operated Hughes drills, operate on a coking cycle ranging from 15 to 24 hours per drum. Coke production averages 60 tons per day.

The fluid catalytic cracking unit is of the stack-type design with the reactor superimposed over the regenerator. Fresh charge, amounting to 2,644 bbl. per day of straightrun and thermally cracked gas oil is combined with an equal volume of catalytic recycle stock bringing the total reactor feed rate to 5,288 bbl. per day.

Light catalytically cracked distillates are charged together with light oil coker distillate to the vapor-recovery system where high-octane gasoline is separated by a combination of absorption and polymerization feed stocks, which comprise 50 per cent C_3 and C_4 olefins. Light and heavy gas oil are recycled to the reactor.

Poly unit feed is chemically treated for removal of hydrogen sulfide, mercaptans, and nitrogen compounds. Conversion of olefins to polymer is estimated to amount to 75 per cent of propylene and 85 per cent of butylene. High-octane polymer gasoline amounting to 500 bbl. per day is stabilized by removal of fuel gas and unconverted C_4's.

Three copper chloride sweetening units treat the straightrun gasoline, straightrun kerosine, and light domestic fuel oils and the combined thermal and cat cracked gasoline stream.

Three Foster Wheeler "SA"-type steam generators, each with a maximum continuous rating of 35,000 lb. of 250-psi. steam provide refinery power and processing requirements.

Montreal Team Opens Plant

EDMONTON, Alta.—A new $250,000 refining unit with a capacity of 1,000 bbl. daily has been opened at Bonnyville, 190 miles northeast of here, by Tor American and Tri-Tor oil companies of Montreal.

The opening marked completion of the first step of the owners' $1,000,000 refinery-construction program at Bonnyville. Tri-Tor and Tor American produce about 16 wells in this vicinity.

Riverlake Plans New Plant

FORT WILLIAM, Ont.—Riverlake Oils, recently organized and financed largely by local interests, soon will start construction of a 4,000-bbl. refinery here at a cost of around $500,000.

The plant will operate on Alberta crude brought by tanker from Superior, Wis.

SOUTHWEST

University Fund Growing

AUSTIN.—The University of Texas now has under oil and gas lease more than half a million of the 2,000,000 acres it controls.

It has accumulated $143,372,433 in its permanent fund from royalty income and lease-sale bonuses—and is expecting the money to continue rolling in.

The most recent lease sale, involving 39,000 acres in West Texas, brought the university a record-breaking $7,805,500 in bonuses.

More than 2,200 wells drilled in 66 producing fields on university lands have yielded a total production of approximately 350,000,000 bbl. The university receives the customary one-eighth royalty on oil and gas production, but most of its income is derived from bonuses paid for leases.

The money derived from the holdings enters the university's permanent fund—and stays there. State law prevents spending of the principal, but permits use of interest derived from the permanent fund.

GULF COAST

Offshore Wildcat Planned

MOBILE.—The first wildcat in the coastal waters off Mississippi is being planned by Gulf Refining Co.

Gulf has asked permission of the U. S. Corps of Engineers to construct a mooring for a drilling barge in the Bay St. Louis area of Mississippi Sound.

Gulf, which has extensive lease holdings in South Mississippi as well as in Mississippi Sound, has been doing geophysical work in these areas, and the Bay St. Louis wildcat will be the first attempt to find oil since earlier unsuccessful attempts by Gulf in Mobile Bay.

Proposed site for the test is approximately 1,600-ft. north of the Gulf intercoastal waterway near the Lake Bornge lighthouse. This is about 10-miles southwest of Bay St. Louis, Miss.

Texas Test To Start

HOUSTON.—Texas Eastern Production Corp. this week is expected to spud a new offshore well on its lease about 7½ miles off the coast of Galveston Island in the Gulf of Mexico, according to H. A. Hemphill, president.

The well will be projected to a vertical depth of approximately 6,000 ft., and will be drilled from an existing platform in the company's 11,070-acre offshore block.

Two wells had been drilled from the platform before Texas Eastern obtained the offshore acreage. A vertical hole capable of substantial gas production was bottomed below 5,900 ft., while a dry hole was drilled to the northwest. The present test will be directionally drilled to the southeast.

Salt Dome Production Co., Houston, has the drilling contract, and a drilling tender has been rented from Stanolind Oil & Gas Co.

WEST COAST

Richfield Drilling Deeper

BAKERSFIELD, Calif. — Richfield Oil Corp. is drilling its prolific Wheeler Ridge stepout deeper this week after tests developed a flow of 1,100 bbl. of oil daily from a new formation believed to be of Lower Miocene age.

At last report, the well 76-29 Kern County Land Co., had reached 6,665 ft. This is about 3,000 ft. above the top of the Eocene pay, the ultimate goal in which the Wheeler Ridge discovery was completed. Thickness of the Eocene is yet to be determined.

Tests of the new pay were carried out at 6,300-6,500 ft. through a ½-in. choke. Gravity of the oil was 44°. The new pay was indicated last April during the drilling of the Eocene discovery, but no tests were made of the section.

West Edison Interests Sold

BAKERSFIELD. — Macmillan Petroleum Corp. has purchased California Exploration Co.'s interest in West Edison field leases which the two firms have owned jointly since 1950. Consideration in the deal was not revealed.

The properties involved consisted of 325 acres on which 10 oil producers have been completed. They adjoin a lease on which Macmillan has five producers and a sixth drilling.

Huge Gas Gains Forecast

MPC estimates consumption will climb 150 per cent by 1975, but warns that eventual shift to other fuel is inevitable

Bertram F. Linz

WASHINGTON. — Consumption of natural gas in 1975 will be more than two and one-half times the 6 trillion cubic feet consumed in 1950, according to the President's Materials Policy Commission.

Industrial consumption currently accounts for more than two-thirds of the total demand (4,400 billion cubic feet in 1950) but by 1975, although this consumption will double, to 8,800 billion cubic feet, it will be but little more than half the total.

The greatest increase, 320 per cent, is foreseen in residential heating, for which the demand will rise from 1,000 to 4,200 billion cubic feet in the 25-year period.

No large imports . . . The commission found the United States cannot now supplement domestic supplies with large imports, though "modest" imports from western Canada to the Pacific Northwest seem assured and it may later become economical to pipe gas from Mexico. Nor is there yet developed for gas, as for liquid fuels, a substitute derived economically from our abundant reserves of solid fuels, though later economic and technical developments may alter this outlook.

The lack of balance between demand and supply is likely to exert continuing upward pressure on prices, but, if the supply were available, consumption by 1975 could readily rise to as much as three times the 1950 figure even at a somewhat higher price.

Long-range objectives . . . Since the problem can be simply stated, the main objectives of long-range policy were set forth in the report in equally simple terms:

. . . **Encourage** maximum economic discovery and recovery of the nation's natural-gas resources.

. . . **Derive** the greatest economic advantage from these resources while they last.

. . . **Minimize** the costs and dislocations of the eventual shift from natural gas to other forms of energy.

Despite the great improvements which have been made in the handling of natural gas, much still is wasted either by being flared or by being used uneconomically, the commission declared.

Demand still is running well ahead of supply in distant markets, while many oil producers lack pipe-line outlets and are left with a surplus. As a result, the Bureau of Mines estimates about 10 per cent of extracted gas continues to be flared or otherwise wasted —about two-thirds of the 1950 residential consumption of natural gas.

Another problem results from the "overhead economics" of pipe lines whose owners have a strong incentive to maintain a year-round flow at full capacity so as to maximize earnings.

The report pointed out also that de-

Journal Editors Confer

Members of the editorial staff of The Oil and Gas Journal are shown here following a luncheon during their annual 3-day conference in Tulsa. Discussions of editorial problems and the program for the coming year highlighted the meeting. Luncheon speakers who addressed the staff during the conference were Dr. B. B. Weatherby, vice president of Amerada Petroleum Corp.; Don Carr, assistant manager of research and development of Phillips Petroleum Co.; and R. W. Wire, president of Loffland Bros. Co. Seated around the table clockwise, are Joseph A. Kornfeld, Tulsa; P. C. Lauinger, president and publisher, Tulsa; Nell Williams, Tulsa; Henry D. Ralph, news editor, Tulsa; R. W. Wire, president of Loffland Bros., Tulsa; Martha Allbright, Tulsa; Carolyn Carter, Tulsa; John C. Casper, Tulsa; Wilma Van London, Houston; Gerald L. Farrar, engineering editor, Tulsa; and C. O. Willson, editor, Tulsa. Standing, clockwise, are Bertram F. Linz, Washington; Ted Armstrong, Tulsa; F. Lawrence Resen, Houston; Oscar B. Irizarry, editor of Petroleo Interamericano, Latin American affiliate of the Journal; Dahl M. Duff, international editor, New York; Paul Reed, pipe-line editor, Tulsa; R. B. Tuttle, Tulsa; John C. McCaslin, Tulsa; Simon H. Rourke, executive vice president, Tulsa; Lynn M. Nichols, Tulsa; David H. Stormont, Los Angeles; Carl Hoot, Dallas; William P. Sterne, Tulsa; Walter Rose, Houston; George Weber, refining editor, New York; Roy F. Carlson, Midland, Tex.; Philip C. Ingalls, Tulsa; Robert Enright, Tulsa; Kenneth B. Barnes, managing editor, Tulsa; and George Vargas, Petroleo Interamericano, Tulsa.

clining supplies of the fuel may contribute to severe economic dislocation in gas-producing areas where industries and whole communities have grown to depend heavily upon natural gas.

Problems for study . . . The steps that should be taken to encourage maximum discovery and economic recovery of natural gas are closely linked with the problems of seeking to maximize the nation's economic advantages from its natural gas resources, the commission said in posing these key questions for industry consideration:

1. How can the nation get the greatest use from gas in lifting oil so as to get maximum economic recovery of petroleum resources?

2. How can it minimize economically the physical waste of gas in flaring?

3. How can it minimize inferior uses of gas for which more abundant energy resources, notably coal, would serve as well and at lower real cost to the nation in the long run.

4. How can it avoid severe dislocation and heavy capital costs in transferring nearby and distant consumers to other fuels, and in abandoning pipe lines, when the supply of natural gas turns downhill?

"The major job of bringing about adjustments in accord with national policy must be carried by the same private industries that were responsible for the sensational growth of the gas fuel industry," the commission declared. "Strong market forces already are encouraging desirable adjustments which government must help to guide and accelerate."

Price and profit forces will exert powerful pressures, but there is room for further progress in conservation at the field, the pattern of economic use, and the authorizing of additional pipe lines.

The commission took the position that the shift in natural-gas consumption should come from voluntary measures and expressed doubt of the efficacy of meeting the problem by detailed regulation.

Danger in expansion . . . The report warned against unwarranted expansion of pipe-line facilities, declaring in view of the limited reserves "there is no economic virtue simply in further expanding pipe lines, but a clear advantage exists in extending or enlarging access of high-advantage users." The problem is not yet one of whether or not to authorize further construction but of how much to permit and under what circumstances.

"It will become increasingly important for the Federal Power Commission, in considering dedicated reserves for a proposed pipe line, to consider the eventual impact of new dedications upon the useful life of existing pipe lines, upon the consumers they serve, and upon the long-range supply position of communities in the producing area," the commission commented.

"Excessive building of pipe lines and overcommitment of limited reserves could lead, when reserves are gone, to premature obsolescence of costly capital equipment for operators and consumers alike."

Refining Expansion

Certificates issued since the start of fast-tax-amortization program cover 1,289,000 bbl. daily of new crude capacity

WASHINGTON.—The nation's smaller refineries are benefiting proportionately more than the larger ones from the tax-amortization program of the Petroleum Administration for Defense, according to an analysis of results from the beginning of the program through April.

If all the construction is accomplished, the nation's crude-throughput capacity will increase by 1,289,492 bbl. per day, and its catalytic cracking capacity by 922,795 bbl. per day.

A certificate of accelerated tax amortization permits a refiner in computing federal income taxes, to write off out of profits the cost of the construction in 5 years instead of the longer period normally required. This is a defense measure designed to speed up construction of needed facilities. Some of the approved certificates cover facilities already built or building, while other projects may not be started in the immediate future.

The PAD analysis divided the nation's refiners into 19 companies controlling capacity of 50,000 bbl. per day or more; 19 companies in the intermediate group with plants between 20,000 and 50,000 bbl. per day; and approximately 150 small refiners with capacity of less than 20,000 bbl. per day each. It outlined the position of each group this way:

Large refiners . . . On January 1, 1951, large refineries had 81.52 per cent of the crude-topping capacity and 91.21 per cent of the catalytic cracking capacity.

Since then these companies have received tax-amortization certificates covering 936,260 bbl. daily of crude-topping capacity and 697,820 bbl. daily of cat cracking capacity.

Completion of all the certificated programs will give these companies 80.1 per cent of the crude-topping and 86.17 per cent of the cat cracking capacity of the nation.

Intermediate refiners . . . The medium-sized plants as a group had 8.62 per cent of the crude-topping capacity and 6.93 per cent of the cat cracking capacity in January 1951.

Since then they have obtained amortization certificates for 144,250 bbl. daily of crude-topping capacity and 74,300 bbl. daily of cat cracking capacity.

Completion of the program will give this group 9.03 per cent of crude-topping capacity and 7.29 per cent of cat cracking capacity.

Small refiners . . . The group of smallest refiners had 9.86 per cent of crude-topping capacity and 1.86 per cent of cat cracking capacity in January 1951.

They have now received certificates covering 208,982 bbl. daily of crude capacity and 150,675 bbl. daily of cat cracking capacity.

Fulfillment of this program will give the group 10.87 per cent of the nation's crude capacity and 6.54 per cent of the catalytic cracking capacity.

Price Lid Raised

Ceiling on heating oils on East Coast raised by OPS

WASHINGTON.—Ceiling prices for light heating oils on the East Coast were raised 0.8 cent a gallon as of June 30 by the Office of Price Administration.

Primary suppliers were allowed an increase of 0.65 cent per gallon if they were selling at the low of the market. Distributors operating bulk plants may pass on this increase and add a further 0.15 cent per gallon.

Specific ceiling prices were listed for tank-car sales at major distribution points from Maine to Florida. Ceilings for tank-car sales of No. 2 fuel now are: 9.95 cents a gallon at Boston; 9.75 cents at New York Harbor; and 9.85 cents at Philadelphia.

Kerosine prices are limited to 1.0

WATCHING WASHINGTON

Bertram F. Linz

Two Experts, Two Views

A sharp difference of opinion between high government officials on the question of inflation was revealed in Washington last week.

Addressing a meeting of business paper editors, Price Director Ellis Arnall asserted that inflationary pressures are increasing and will prevail throughout the whole period of the mobilization program.

Talking to the same group, Leon Keyserling, chairman of the Council of Economic Advisers, asserted that inflation has not been a major threat and is not now a problem.

Arnall referred to the applications for price increases filed for many commodities, including oil, as demonstrating that prices are not "soft" and would not decline if the controls were lifted.

On the other hand, Keyserling pointed out that the inflation which preceded price control developed before the defense program was adopted and at a time when there were no external pressures, and said it was the result of scare buying. The great increase in national productivity, he said, has been a greater preventive of inflation than heavy taxes and controls.

Tariff Cuts Being Felt

Expiration of the Reciprocal Trade Act next June 12 may make tariff reduction the first foreign policy on which the next President will have to take a position.

That there will be strong opposition to continuance of the act was seen in disclosure that petitions for relief are being filed with the Tariff Commission in large numbers by industries beginning to feel the effects of foreign competition.

While industry generally is just beginning to react to the effects of tariff reductions, the Independent Petroleum Association of America over the past several years has repeatedly sought relief from the increasing imports of foreign oil in which it saw a threat to domestic production.

The explanation for the belated impact of the reciprocal trade policy adopted some 18 years ago is that during the depression 30's the United States did not offer an attractive market for foreign goods; during the war years normal international trade was suspended, and in the period immediately following the war foreign manufacturers were concerned chiefly with rehabilitating plants and meeting domestic needs.

The Marshall Plan gave the necessary impetus to European production for export and foreign goods have been coming into the United States in volume during the past year or so.

In the case of oil and one or two other commodities, the conditions which delayed the volume production of other goods did not prevail, hence the increase several years ago in petroleum imports.

What Lies Ahead

The President's materials policy commission has taken a look at the world of 1975 and come up with some interesting figures.

If you are still here then you will be one of a population of 193,000,000 and a working force of 82,000,000 with an output of all goods and services of about $566,000,000,000, measured in dollars of 1950 purchasing power.

The problem of our future supply of oil and other raw materials is not one of absolute shortages, according to the commission, but of insidiously rising costs which can undermine our rising standard of living, impair the dynamic quality of American capitalism and weaken the economic foundations of national security. These costs are not just dollar costs but what economists call "real costs"—the hours of human work and the amount of capital required to bring a given amount of material into useful form.

This situation already has arisen in the petroleum industry, well in advance when it will hit most other industries.

The commission's 813-page report is interesting throughout, but especially for the down-to-earth approach of the experts who made the studies. They don't believe we're in imminent danger of running out of oil, natural gas or anything else. They will be tougher to find in the future, and eventually our underground resources will be exhausted. But they don't see exhaustion occurring in this generation or the next.

cent a gallon more than the listed ceilings for No. 2 fuel.

No. 1 and No. 3 fuels carry the normal differentials compared with No. 2 fuel.

Barge deliveries of light fuels will have ceilings that are 0.1 cent less than prices allowed for tank car sales.

Sales of full tanker cargoes will be at prices at least 0.55 cent a gallon under the tank car prices for the terminal points.

OPS stated that John R. Steelman, acting defense mobilizer, made this decision "to insure that adequate supplies of fuel oil will be available on the eastern seaboard during the coming heating season."

Product Exports Up

WASHINGTON.—Exports of major petroleum products averaged 253,300 bbl. daily for week ended June 6 for an increase of 71,300 bbl. daily over previous week, according to figures compiled by the Petroleum Administration for Defense.

Increases were reported for all products with the exception of motor gasoline.

Daily average shipments for the week, compared with the week ended May 30 and the average for 4 weeks ended June 6, in thousands of barrels, are shown in the accompanying table:

	Week ended June 6	Week ended May 30	Average 4 weeks
Aviation gasoline	26.3	4.2	13.7
Motor gasoline	12.5	16.7	14.2
Kerosine	24.2		21.7
Distillate	83.7	63.8	79.7
Residual	88.6	79.3	76.8
Total	235.3	164.0	206.1

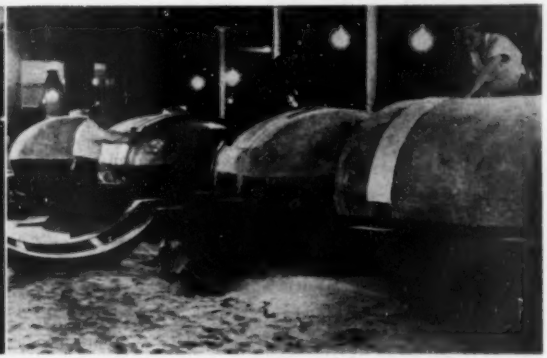
Emergency Steel Exhausted

WASHINGTON. — Dwindling steel supplies have forced the Petroleum Administration for Defense to stop issuing authorizations for purchases of casing and tubing from emergency field stocks assigned to wildcatting for the duration of the steel strike.

Deputy Administrator J. Ed Warren said a check on authorizations made shortly after the start of the strike showed that enough tickets had been issued to account for all of the emergency pipe in inventory. It is unlikely that any more will be delivered to these stocks until the strike ends, he said.

All operators applying for an allocation from emergency stocks will receive acknowledgment of receipt of their applications. Those whose applications are denied will be notifed immediately of that fact. Approved applications will be kept on file.

1 Early step in manufacture of glass-plastic tanks is cutting of Fiberglas mat to fit contour of wood, wax-coated mold. The surface is then sprayed with a 1/16-in. coat of Laminac resin. Layers of glass mat are added, and each is sprayed with an especially catalyzed resin.



2 After the tank is formed, live steam is shot into the tank interior to cause the high-temperature catalyst to react. Here the finished fuel tanks are shown being secured to steel bolsters and held in place by steel bands. The bands and bolsters are covered with the Laminac-Fiberglas combination before being mounted on the truck.

MIDDLE EAST

Better Desert Tanks

Plastic-glass tanks solving Aramco's corrosion problem resulting from sandstorms; other advantages also claimed

A PLASTIC-GLASS combination conceived to perform a number of military uses during World War II has been adapted to the manufacture of tanks for trucks now in service with Arabian American Oil Co. in Saudi Arabia.

Aramco has equipped 15 trucks with the new-type tanks—two 1,000-gal. fuel-carrying tanks and one 100-gal. water tank for each vehicle. The company expects the glass-plastic tanks to last from 10 to 50 times as long as steel tanks on the desert where conditions are especially severe.

Aramco has had a vexing problem involving its tank trucks. Frequent desert sand storms wore off the paint, leaving the bare metal subject to corrosion. It is this expensive corrosion problem that the glass-plastic tanks are expected to eliminate.

The tanks were made of Laminac polyester resin of American Cyanamid Co. and reinforced with Owens-Corning Fiberglas mat. Aramco turned to the reinforced plastic following a field request for a 2,000-gal. service tank that would dispense both gasoline and diesel oil.

This called for major dimensional changes in design, and the company decided at the same time to investigate other possible changes to overcome particularly corrosion. The plastics fabricator spent about a year in research and testing before beginning manufacture. He now receives the bare truck chassis, molds the plastic tanks, and other parts, makes the bronze fittings, and then ships the completed trucks to Aramco. The tanks are molded by Carl N. Bettle Plastics Corp. of Fall River, Mass.

Advantages claimed for the tanks include a substantially greater carrying capacity. Aramco's new tanks, weighing 1,000 lb. mounted, have more than one-third additional capacity than steel tanks of the same weight. Repair kits have been made available in Saudi Arabia. This job is said to require only a simple cleaning of the ruptured area and then closing and reinforcing the break with the plastic-impregnated fiberglas mat included in the kit.

Other applications of the glass-plastic combination on the new Aramco trucks included the housing for the pumping mechanism and the walkways along the truck's side.

The fabricating company is looking to the manufacture of tanks of this type for service-station use.

3 An Aramco fuel tank-truck ready for service on the Saudi Arabian desert. It is fitted with two fuel tanks and a smaller 100-gal. water tank which is mounted to the left rear of cab.

New Crude Line

Pipe on way for projected 75-mile, 24-in. Basrah line

BASRAH PETROLEUM CO., LTD.'s proposed new 24-in. pipe line from Zubair to Fao is a part of an expansion program under which production of this Iraq Petroleum Co., Ltd., associate will reach about 160,000 bbl. daily by the end of 1955.

The 24-in. line will parallel the existing 75-mile, 12-in. line which was opened last December to begin the first commercial production from the important Zubair field.

The order for the pipe was placed recently by Basrah Petroleum with the British firm, South Durham Steel & Iron Co., Ltd.

Hitherto, most large-diameter pipe has been obtained in the United States. First consignments of pipe are already on their way to southern Iraq. The pipe order is to be completed and delivered by March of next year. Laying of the line will begin in May and is expected to be completed by the end of the year.

Basrah Petroleum also is preparing to construct two additional jetties at the Fao terminal, additional field separator stations, and more pumping facilities on the line.

Israeli Oil Law Approved

The Israeli Government has approved a new oil law for the country and made preparations to submit it to the Parliament.

The law, which was drafted with the assistance of Max Ball, Washington petroleum consultant, calls for a 12½ per cent royalty to the government and provides for a 50 per cent income tax on the operating companies. It cancels all previous concessions granted under the British mandate of Palestine.

The Israeli minister of development said the measure was designed to encourge investment by foreign oil capital. It assures competition by limiting the maximum area allotted to each concession so that the entire country may be divided into at least 50 concession areas. It requires that Israeli's requirements be met before any oil is exported.

LATIN AMERICA

New Prospects in Peru

Recently issued regulations tone down country's oil law; several American firms may seek concessions this year

Dahl M. Duff

A HALF dozen large oil companies are now taking a critical look at Peru's new oil law and regulations with a view toward initiating exploratory operations later this year.

Despite some initial reservations about the terms of the law *(The Oil and Gas Journal, March 3, page 63)*, most of the companies appear to be ready to give it a try in an effort to assess thoroughly the prospects of developing large-scale production. If the work is successful, the result could easily be an oil boom in this South American republic.

The newly issued regulations have taken some of the sting out of the law itself. They were issued by the Ministry of Development and Public Works and consist of 365 separate articles. Industry sources describe them as generally favorable and designed to promote maximum development without the harassing features that are sometimes found in such rules.

National companies—those with 60 per cent or more of the stock owned by Peruvians—are given preference in the initial applications for oil rights under the law. These companies can file during the 30-day period beginning August 10. October 27 has been set as the earliest date for receiving applications from foreign-controlled companies.

The area of greatest interest is the Sechura Desert region in the coastal zone of Peru. The government has divided this area into 11 blocks containing 152 parcels ranging in size up to 19,550 hectares. National companies can take one or more concessions with a minimum of 10,000 hectares and up to 10 per cent of each block.

Interested companies . . . Aside from the government-owned Empresa Petrolera Fiscal, which has about 1,000 of Peru's some 45,000 bbl. daily of production, the only nationally owned Peruvian company is Compania de Petroleo El Oriente which has drilled in the Pirin District near Lake Titicaca. Another Peruvian owned company is in the process of formation in order to take advantage of acreage offered under the new law.

The foreign companies most prominently mentioned as interested in Peruvian operations are International Petroleum Co., Ltd., Socony-Vacuum Oil Co., Inc., Gulf Oil Corp., Union Oil Co. of California, Standard Oil Co. of California, and Conorado Petroleum Corp.

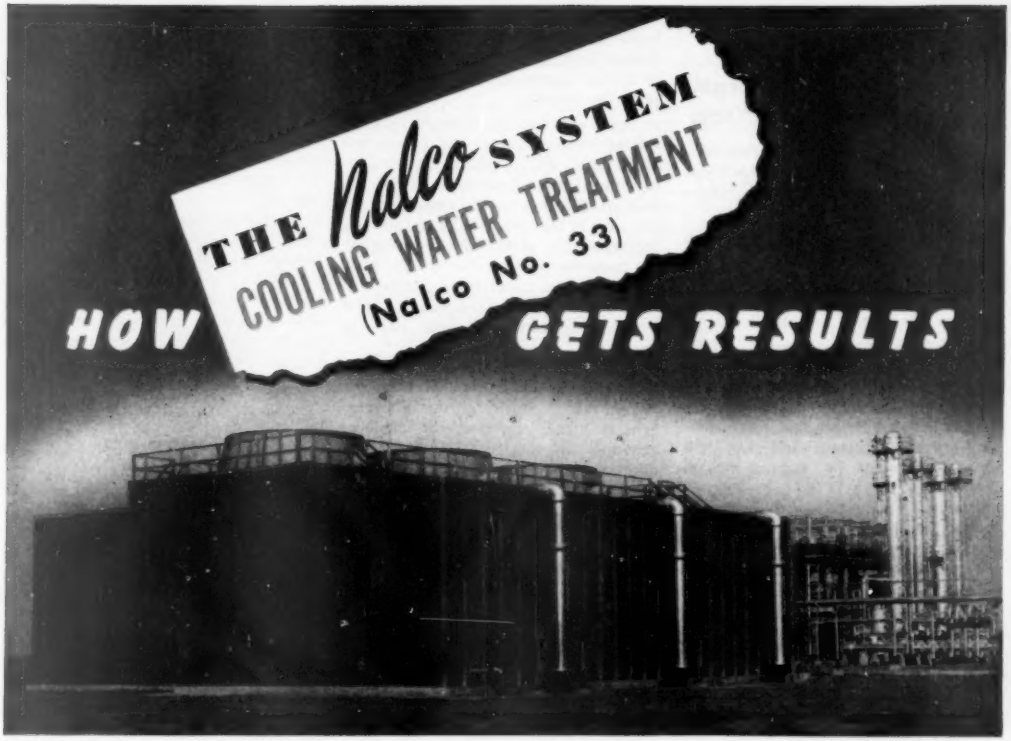
International, controlled by Standard Oil Co. (N. J.), has been active as a producer and refiner in Peru for many years. In 1946, it negotiated a contract for rights on about 5,500,000 acres in the Sechura Desert, but the concession became a political issue and was never ratified.

International, Richmond Petroleum Co. (Standard of California), and Conorado carried out some preliminary exploration surveys in the Sechura desert about 2 years ago. However, these companies as well as the other prospective operators would have to do more detailed work on whatever acreage they might obtain.

Provisions of law . . . The Peruvian petroleum law passed this spring incorporates a 50-50 profit sharing plan which is considered to be a burdensome requirement for new operators seeking to develop production in unknown prospecting country with complex geology and without a history of large fields.

Another provision is for a 20 per cent export tax, but this is allowed as a prepayment of income tax. On the more favorable side, the law incorporates a 15 per cent depletion which, in the coastal zone, would accrue to operators who were able to develop large production of about 25,000 bbl. daily or more. For those obtaining less prolific production, the depletion works out to a lesser percentage.

Most of the initial interest at least is in the coastal zone where only short pipe lines would be necessary to move the oil to tidewater. But there is a chance the law may lead to a revival of work in the interior trans-Andean Montana region.



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- Provides *complete* recirculating system protection against scaling and corrosion.
- Maintenance of pH between 6.0 and 6.5 prevents scaling, stops deliginification of cooling tower lumber, and cuts chemical requirements for slime and algae control as much as 50%.
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Type of Plant	Recirculation Rate (gpm)	Hardness of System Water (ppm)	Results (as reported from the field)
Refinery	105,000	550	Gradual improvement during the 22 months of operation with No. 33 has been experienced in cleanliness of the system and absence of corrosion. Slime control has been easier.
Compressor Station	4,800	1,200	This job was almost impossible to treat. Results are excellent.
Chemical Plant	2,100	1,000	Condensers have been in service two years without cleaning. No scale or plugging of tubes due to bacteria or slime was found within that time.
Steel Mill	1,200	40	Results are excellent. High skin temperatures in furnace are experienced but no corrosion or scale has been found in these hot sections since using No. 33.
Distillery	4,300	200	Very good. They experienced considerable slime before starting treatment. The lower pH permitted slime control with economical dosages.
Gasoline Plant	2,000	3,400	Coils at the base of the tower stay clean in spite of the tremendously high hardness.

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Mexican Question

Oil agreements are illegal, former Pemex counsel says

DO the percentage-of-production contracts held by several foreign operators with Petroleos Mexicanos violate Mexican law?

When Pemex signed the first such contract with Mexican American Independent Oil Co. in 1949, some legal experts in the oil business thought the question was at least a doubtful one.

In Mexico City, last month, Atalio Vasquez Pallares, a congressman from the west central Mexican state of Michoacan, charged in the capital's newspapers that Pemex had gone counter to the constitution and the 1938 expropriation law by making the oil agreements.

Pemex's answer was to request a formal investigation of the accusations by the federal attorney-general. Pallares, who incidentally is a former legal adviser to the government oil company, said he was willing to waive his congressional immunity to support his charges before the authorities.

Besides the charge of illegality, the congressman also claimed that the contracts are slowly but surely placing Mexican oil back under foreign control. He said Pemex had no right to contract with foreigners for Mexican oil because it belongs to the nation.

With its request for an investigation, Pemex was meeting the issue head-on in an obvious effort to settle the question once and for all. The developments had the makings of a hot Mexican political controversy.

No majors involved . . . The ironic angle to Pallares' charge that the contracts are returning Mexican oil to foreign control is that Pemex has failed to attract large-scale foreign oil capital into the country.

These contracts provide for drilling on separate structures. If production is obtained, the operator recovers his expenses from 50 per cent of the oil, then (in the case of land structures) 15 per cent of the yield of the well during the remainder of the 25-year contract. He receives nothing for a dry hole. Main operator under these contracts is Mexican American Independent. CIMA has developed one oil field and one gas field.

In requesting the investigation, Pemex said the contracts had been approved as to form by the attorney-general, the secretaries of national economy and foreign affairs, the president of the Supreme Court, and the president of the republic, Miguel Aleman.

FAR EAST

Bigger Refinery Planned

Shell Co. of Australia, Ltd., has enlarged its plans for the construction of a new refinery at Geelong, near Melbourne, Australia.

Plant capacity has been revised upward from about 16,500 to 24,000 bbl. daily, and the cost is expected to be A£5,000,000 (about $11,000,000) instead of the A£4,000,000 originally estimated. Storage capacity will be about 1,570,000 bbl.

The Shell organization has placed the order for the Geelong distillation unit with Wekspoor, Ltd., at Utrecht.

The Shell plant is one of four major refinery-construction projects which will add about 125,000 bbl. daily to Australian refining capacity.

Standard-Vacuum Oil Co.'s Australian affiliate plans a 22,000-bbl. daily expansion, while Anglo-Iranian Oil Co., Ltd., has announced a 60,000-bbl. daily project for Fremantle. The fourth is the Caltex project of 20,000 bbl. daily or more.

A recent report from Sydney said the New South Wales state cabinet had approved in principle the establishment of Caltex's refinery at Kurnell, Botany Bay. It said the company proposes building an A£25,000,000 industry and hopes to have the refinery operating in 2 years.

Bombay Refinery Realized

Lummus Co. has been awarded the construction contract for the new 25,000-bbl.-daily refinery to be built at Bombay, India, by a refining subsidiary of Standard Vacuum Oil Co.

The head engineer in Lummus' coordinating department is now in Bombay with an advance party of Stanvac refining - coordination representatives from New York to expedite field survey work for the contractor in connection with the $35,000,000 project, Stanvac said.

International Briefs

A Burmese delegation consisting of three cabinet ministers and including the minister of mines, was in Caracas late in June for talks with Venezuelan authorities on petroleum subjects and other matters.

A $21,000,000 plant for the production of lubricating oil at the Cardon refinery of Shell Caribbean Oil Co. has been officially opened. Santiago Vera Izquierdo, Venezuelan minister of mines and hydrocarbons, formally dedicated the new facilities. The plant is expected to produce 100,000 tons a year (about 2,000 bbl. daily), enough for Venezuela's domestic requirements plus a surplus for export.

Construction of a natural-gas pipe line from the Po Valley area in northern Italy to consumers in Switzerland is being discussed in negotiations reported recently to be under way between the Italian Medandotti company (S.N.A.N.) and the Zuriche Elektrobank. The line woull run from Seregno in Lombardy to Ponte Chiasso in Switzerland.

A West German oil discovery near Wolkskehlen, south of Frankfort, has been reported by officials of the German company, Elwerath. The area was the scene of a blowout and fire in a gas well in July 1951.

Guests of New York Chapter of Nomads

Visitors at the annual spring golf party of the New York chapter of Nomads included this group. Left to right are J. Boswell, of J. Boswell & Co., Japan; C. T. Longcroft, Oil Well Supply Co., England; C. O. Isakson, Colombian Petroleum Co., Colombia; L. Daniels, Arabian American Oil Co., Saudi Arabia; J. S. Page, Page Oil Tools, Inc., California; and W. Seville, Texas Petroleum Co., Colombia. The party was held June 12 at the Westchester Country Club, Rye, N. Y.

Shell Executive

Pipe-line vice president pioneered pumping method

DONALD H. LEWIS, recently elected vice president of Shell Pipe Line Corp., has been active in technical engineering for more than 3 decades.

Lewis, who joined Shell in 1927, has been its chief engineer since 1939 and a company director since 1942.

After receiving his bachelor's degree in engineering, he went to France where he completed the Allis-Chalmers graduate student training course at the University of Besaucon. During World War I he served in France with the Army Ordnance Corps.

He achieved distinction for his work in the use of electrically powered centrifugal pumps on crude-oil trunk lines while working for Allis-Chalmers Manufacturing Co. from 1920 to 1927 as a design and application engineer.

He also is widely known for the important construction projects carried out under his technical direction at Shell. These include the East Texas gathering system, the Bayou system, and the Venezuelan Lightline. From 1931 to 1938 he served as East Texas division superintendent and as West Texas area superintendent.

Lewis is a member of the American Petroleum Institute committee on pipeline technology and represents the Institute on inter-industry committees drafting oil and gas pipe line welding specifications and revising American Standards Association B-31 code of pressure piping.

R. M. Decker has been appointed district production foreman for Pan American Production Corp. at Lyford, Tex. He formerly was production foreman for the Southeast Texas division. **J. V. DeBlanc,** production foreman for the Southeast Louisiana district, has been named district superintendent.

Gene Eaton has resigned from British-American Oil Producing Co. to become district geologist for Sunray Oil Corp. at Casper, Wyo.

Noboru Kawakami, Loomis, Calif., a graduate of the University of California, has joined **J. R. Fanshawe,** geological consultant at Billings, Mont., as a geologist.

J. W. Hudson, general superintendent of production for Deep Rock Oil Corp., has been appointed superintendent of drilling. **A. L. Rhodes,** district production superintendent at Garnett, Kans., has been appointed to succeed Hudson. Other company changes announced in Tulsa include: **Donald K. Auld,** chief engineer for the Eastern Kansas district, named to succeed Rhodes, and **James M. Moore,** operations analyst, appointed office manager in the production division's Tulsa headquarters.

Frank Lindeman, Jr., manager of the producing department, and **Foster J. Schempf,** director of exploration for Stanolind Oil & Gas Co. at Tulsa, have been elected to the board of directors. Lindeman, an engineer, and Schempf, a geologist, both joined the company in 1933. Lindeman's former positions with the company include that of assistant division superintendent at Houston, and operating superintendent and general superintendent at Tulsa. Schempf formerly was division exploration superintendent at Houston, central division manager at Oklahoma City, and division manager at Houston.

William H. Easton, professor of geology at the University of Southern California, has been given a year's leave of absence to receive a temporary appointment by the U. S. Geological Survey to study stratigraphy and paleontology of the Williston basin.

Frank C. Smith, president of Houston Natural Gas Corp., has been nominated for the presidency of the American Gas Association. Other nominations, to be voted on at the 1952 convention in Atlantic City October 27-30 include: **Earl H. Eacker,** president, Boston Consolidated Gas Co., Boston, for first vice president; **F. M. Banks,** president and general manager, Southern California Gas Co., Los Angeles, for second vice president, and **Edward F. Barrett,** president, Long Island Lighting Co., Mineola, N. Y., for treasurer.

Milton Kuhleman, Henderson, Ky., has been appointed geologist for Ashland Oil & Refining Co. in the company's new division offices in Billings, Mont.

Howard Boyd, Washington, D. C., has been elected vice president and assistant general counsel of El Paso Natural Gas Co.

Brown L. Meece has been appointed assistant to the president of Sinclair Refining Co. Until recently he was vice president and manager of Sinclair's western sales division.

James C. Dotson, formerly division gager for Service Pipe Line Co. at Denver City, Tex., has been named district superintendent in the company's new headquarters in Lovington, N. M.

E. R. Baker, assistant manager of the development and research department for Continental Oil Co. at Ponca City, has been promoted to manager. He succeeds **L. L. Davis,** who retired after 25 years of service. Davis will continue to serve the company in a consulting capacity.

E. J. Bartosh, of Bankline Oil Co., has been elected chairman of the conservation committee of California Oil Producers. Other officers elected include: **C. A. Davis,** Richfield Oil Corp., first vice chairman; **R. J. Stephens,** Kern Oil Co., Ltd., second vice chairman; and **L. R. Rogers,** Superior Oil Co., secretary.

John Brook, Westfield, N. J., has been promoted to special assistant to the vice president and chairman of the eastern division operating committee of Tide Water Associated Oil Co. He had been assistant supervisor in the statistical department since 1940.

Jesse H. Knight, Calgary, Alta., independent operator, has opened offices in Billings, Mont.

C. R. Canfield, division geologist for Stanolind Oil & Gas Co. at Houston, has been appointed central division geologist at Oklahoma City, succeeding

PERSONALS

E. W. Price. Canfield has been with Stanolind since 1941 and formerly was associated with oil companies in both the United States and South America.

A. B. Cochburn has joined Cabot Carbon Co. at Midland, Tex., as a geologist.

J. E. Teddlie, Jr., engineer for Herman & George R. Brown Oil Co. at Post, Tex., has been appointed production engineer at Midland, Tex.

C. W. Payne has resigned as division geophysicist for Pure Oil Co. in Fort Worth to open geophysical consulting offices there.

Addison L. Hayner, formerly district geologist for Standard Oil Co. of Texas at Iraan, Tex., has been appointed geologist for Reiter-Foster Oil Co. at New York.

Bishop G. Porter, Jr. has been appointed drilling-mud engineer for Gulf Refining Co. at Triumph, La. He formerly was a geologist for Monarch Logging Co. at San Antonio, Tex.

Bert Waggoner, formerly production engineer for Skelly Oil Co. at Hobbs, N. M., has been named reservoir engineer for Continental Oil Co. at Ponca City, Okla.

J. B. Swoape, toolpusher for Penrod Drilling Co., has been transferred from Post, Tex., to Jonesville, La.

Gerald O. Webb, petroleum engineer for Amerada Petroleum Corp., has been transferred from Midland, Tex., to Williston, N. D.

Patrick Daughterty, geologist for McCarty & Coleman, has opened company offices in Billings, Mont.

I. T. Chapman, assistant district superintendent for International Petroleum Co., Ltd., at El Centro, Colombia, has been appointed assistant to the operations manager at Talara, Peru.

David P. Rogers has been elected president of the Union Gas Co. of Canada, Ltd. Other officers elected at a recent meeting in Chatham include: **R. L. Warren,** first vice president; **R. L. O'Brian,** vice president; **T. Weir,** vice president and general manager, and **F. Palin,** comptroller. **W. Dent Smith,** president of Terminal Warehouses, Ltd., of Toronto, was elected to the board of directors.

Opening Canada's New Sulfur Plant

On hand for opening ceremonies at Shell Oil Co. of Canada's new sulfur plant at Jumping Pound, Alta., were, left to right, Joseph S. Irwin, consulting geologist; W. M. V. Ash, president of Shell of Canada; Dr. J. Ritchie Donald, director of the chemicals and explosives division of Canada's Department of Defense Production; P. L. Kartzke, vice president of Shell of Canada in charge of exploration and production in western Canada; and Ralph Will, Alberta oil man. Behind the group is a huge block of elemental sulfur awaiting shipment.

V. F. Harrison has been elected a vice president of Southern Minerals Corp. and Southern Pipe Line Corp. He is in charge of crude supply and marketing for Southern Minerals.

John D. Snakenberg, assistant chief engineer of the manufacturing division of Cities Service Petroleum, Inc., in New York since 1950, has been appointed manager of a large petrochemicals plant to be constructed by American Petrochemical Corp. Site of the plant, somewhere on the Gulf Coast, has not been selected. Snakenberg joined Cities Service in 1923 and was manager of its East Chicago refinery from 1947 to 1950. American Petrochemical Corp. is owned jointly by Cities Service and Firestone Tire & Rubber Co.

Elmer W. Ruhnow has resigned as chief engineer for Anderson-Prichard Oil Corp. at Cyril, Okla., to join Procon, Inc., at Chicago as services manager.

Wallace M. Chamberlain, general manager of the Grand Rapids district of Michigan Consolidated Gas Co., has been elected president of the Michigan Gas Association. **Elmer Gmeiner,** president of Citizens Gas Fuel Co., Adrian, has been elected vice president, and **A. G. Schroeder,** association secretary-treasurer, was reelected.

Leroy E. Bidwell, Jr., engineering trainee for Sohio Petroleum Co., has been transferred from Lake Charles, La., to Natchez, Miss.

J. M. (Max) Harbison has been promoted to assistant production superintendent of Kewanee Oil Co. at Tulsa. He has been assistant to the assistant production superintendent since February. He joined the company in 1941 and has served as district engineer at Pampa, Tex., and as Panhandle division superintendent.

E. A. Smitherman, junior petroleum engineer for Sunray Oil Corp., has been transferred from Premont, Tex., to Tulsa.

Wayne A. Grant, Jr., gas engineer for The Texas Co. at New Orleans, has been promoted to district gas foreman at New Iberia, La.

R. L. Sielaff, division geologist for Sinclair Oil Corp. at Denver, has been appointed geological assistant to **H. B. Smith,** executive vice president, at Tulsa. **C. D. Johnson,** district geologist at Albuquerque, N. M., has been named division geologist at Denver.

Frank W. Abrams, chairman of the board of Standard Oil Co. (N.J.), has

Bethlehem H-150

The handiest light pump of all!

Versatile . . . that's the word for the Bethlehem H-150. It can pinch-hit almost anywhere around a lease.

Primarily, this sturdy little pump was designed for light rotary work; that is, slush-pumping in fairly shallow drilling. But it's also fine for mud-mixing. And out on the lease, it can do an efficient job of gathering. Here's a pump that's seldom idle; it's truly a multipurpose unit.

Structurally, the H-150 has features you generally look for only on costlier machines. For instance:

- Roller bearings throughout
- Alloy-steel gear made from rolled seamless forging
- Alloy-steel pinion
- Drive extension both sides
- Complete oil-bath lubrication
- All-steel fluid end
- API metal ring gaskets on valve covers, stuffing-box housing flanges, discharge flanges, strainer-housing flanges
- Telltale hole protecting fluid end from washouts if packing fails

H-150 SPECIFICATIONS

- **Bore** . . . . . 7¼ in.
- **Stroke** . . . . . 12 in.
- **Maximum input bhp at 70 rpm** 191
- **Maximum working pressure** . . . . . 1185 lb
- **Gear ratio** . . . . . 5.536 to 1
- **Weight less skids** . . . . . 16,500 lb

The H-150 is a beautifully-built pump, and it should last you for years . . . even if you keep it busy all the time. We'd like to give you full details; they are available through the nearest Bethlehem Supply office.

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BETHLEHEM STEEL

PERSONALS

been elected to the board of trustees of The Ford Foundation.

M. T. Endicott, chemical engineer for Gulf Oil Corp. at its Port Arthur (Tex.) refinery, has been transferred to Houston as a member of the crude-oil purchasing department staff.

Harrell Budd has been appointed geologist in the Williston basin offices recently opened in Billings, Mont., by Delhi Oil Corp.

B. J. De Hannas, junior engineer for Service Pipe Line Co., has been transferred from Scottsbluff, Neb., to Casper, Wyo.

Marcus A. Loy, Jr., has returned to British-American Oil Producing Co. at Oklahoma City as an engineering trainee. He has been on military leave of absence while serving at the Coco Solo Naval Station in the Canal Zone.

R. M. Ohlsen, formerly a mechanical engineer for Shell Oil Co. at New York, has been transferred to New Orleans as an electrical engineer.

Ray Kinkaid, seismograph party chief for Continental Oil Co., has been transferred from Limon, Colo., to Kemmerer, Wyo.

Glenn McCarthy, Houston independent, has resigned as chairman of the board of McCarthy Oil & Gas Corp.

H. C. Smith, party chief for E. V. McCollum & Co., has been transferred from Falfurrias, Tex., to Livingston, Mont.

Clint A. Darnall, Dallas, has joined Atlantic Refining Co. as district geologist in Bismarck, N. D.

Tobert H. Williams has joined Carter Oil Co. at St. Elmo, Ill., as a junior engineer.

William D. Owens, district engineer for Union Oil Co. of California, has been transferred from Midland to Brownfield, Tex.

James A. Jackson, assistant division superintendent for Sinclair Oil & Gas Co. at Independence, Kans., has been promoted to division superintendent in the area comprising Kansas, northeastern Oklahoma, Indiana, Illinois, and Kentucky. He has been with the company since 1932.

L. H. Nuland, who has served California Texas Oil Co., Ltd., in a variety of foreign executive positions, has been appointed shareholders' representative for the Caltex group in Australia and New Zealand. Nuland has been managing director of Caltex Oil (N. J.), Ltd., and Caltex (Africa), Ltd.

D. C. Dunaway, who joined Standard Oil Co. (N. J.) organization 18 years ago as an attorney, has been appointed a director and executive vice president of Standard Oil Co. of Brazil. Dunaway has served with Jersey affiliates in Argentina, Spain, Portugal, and in the Caribbean area where he was president of Esso Standard Oil Co. (Cuba).

George Bagnall, formerly an engineer for Magnolia Petroleum Co. at Lovington, N. M., has been appointed petroleum engineer for Thompson Testing Service at Victoria, Tex.

Manchehr Nakhai, director general of the Iranian ministry of labor, toured oil refineries and shipyards in the Los Angeles harbor recently under sponsorship of the U. S. Department of State. He was a guest of Bethlehem Shipbuilding Co. and Union Oil Co.

George A. Davidson, San Francisco, vice president of the Standard Oil Co. of California, has been elected a director of the Air Pollution and Smoke Prevention Association of America.

R. D. Ferguson, U. S. Geological Survey, Casper, Wyo., has been elected president of the Wyoming chapter of the petroleum branch of the American Institute of Mining and Metallurgical Engineers. He succeeds **Sid Richards,** Stanolind Oil & Gas Co., Casper. Other officers include: **H. C. Gleason,** British-American Oil Co., first vice president; **G. W. Berry,** Sun Oil Co., second vice president, and **W. R. Kahla,** Ohio Oil Co., secretary-treasurer.

Vance Sibley is president and **E. H. (Doc) Wilkins** is vice president of Sibley & Wilkins, Inc., Drilling Services, a newly formed company at Levelland, Tex.

R. M. Rogers, formerly a party chief for Donally Seismograph Co., has been appointed district geophysicist for Tide Water Associated Oil Co. at Houston. **Edward L. Bowman,** junior engineer for Eastman Oil Well Survey Co. in Lafayette, La., has been appointed an assistant geologist for Tide Water at Midland, Tex. Other Tide Water company changes include: **Robert P. Grigg,** assistant geologist, transferred from Houston to Lafayette; **Kenneth D. Moriarty,** engineering trainee, transferred from Houston to Midland, Tex., and **James Cadden,** field engineer at Venice, La., promoted to senior engineer in the gas-utilization department at Houston.

Louis L. Watson, Jr., has been named chief geologist and manager of the oil department of Wilkins & Co., Ltd., Denver, Colo. He formerly was a supervising geologist for Geophoto Service of Denver.

Weldon Riley Burns, formerly plant superintendent for Frontier Refining Co. in Cheyenne, Wyo., and for Northwestern Refining Co., St. Paul, Minn., has been appointed a senior project engineer for Catalytic Construction Co.

DEATHS

Floyd Orville Brady, 59, who was associated with Interstate Oil & Gas Co. over 20 years, died June 30 at Claremore, Okla.

Patrick M. Longan, 81, pioneer oil man and president of Lincoln Petroleum Co., died June 24 in Los Angeles.

Howard R. Buckey, 70, Jacksonville, Fla., founder and president of Eastern Seaboard Petroleum Co., Inc., died June 23 in Jacksonville. In the early 1920's he helped organize Orange State Oil Co., which later became a subsidiary of Cities Service Oil Co.

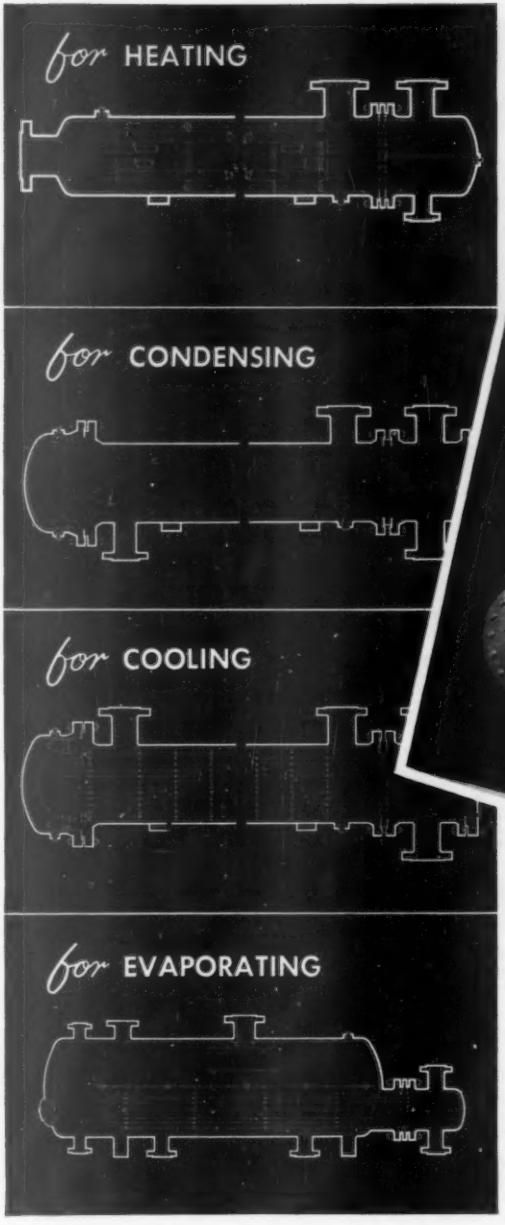
Henry D. Williams, 70, Westfield, N. J., retired vice president of Esso Export Corp., a subsidiary of Standard Oil Co. (N.J.) died June 23.

Harold E. Boyd, 64, geologist for Panhandle Eastern Pipeline Co., died at his home in East Lansing, Mich., June 24.

James W. Hopkins, 73, a retired driller and a native of Salina, Kans., died in Tulsa June 29.

Emmons J. Wade, 54, Warren, Pa., oil and gas producer, died in a Buffalo, N. Y., hospital June 27.

Marion Lynch Barrett, 43, independent oil operator, was killed recently on a well near San Antonio. He was a partner of O. J. Van Horn.



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HEAT EXCHANGERS

ADAMS TERMINAL facilities at Houston plant of Phillips Chemical Co. Phillips Terminal Co. slips are in foreground; ammonium sulfate manufacturing facilities are at center left.

PETROCHEM REPORT:

Phillips Chemical Co., Houston

Plant engaged in expansion which will greatly increase number of products manfactured

by F. Lawrence Resen
Gulf Coast District Editor

A CURRENT $42,000,000 expansion program at Phillips Chemical Co.'s Houston installation will change it from a straight ammonium sulfate plant to one producing several petrochemicals, including ammonia feed for the sulfate production.

In addition to the production of 750 short tons of ammonium sulfate daily, the Houston works will also produce 450 short tons per day of synthetic ammonia, and 3,000,000 lb. per year of synthetic pyridines.

The expansion costs break down to $38,260,000 for ammonia facilities and $3,500,000 for pyridine installations.

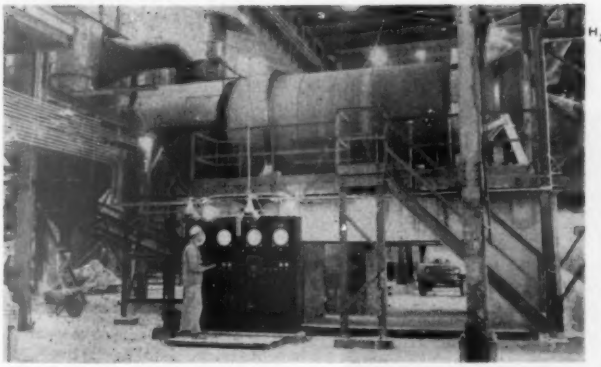
The ammonia will be synthesized from natural gas and will make the Houston installation partially self-sufficient as opposed to previous arrangements whereby ammonia was obtained from the Phillips plant in Etter, West Texas.

Once production facilities for ammonia have been completed, then all steps in the production of ammonium sulfate will be possible at the Houston plant, with sulfuric acid and natural gas being the two prime raw materials.

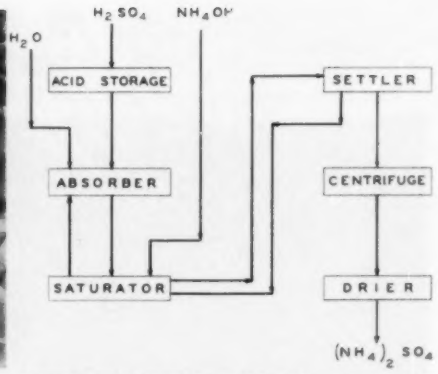
Ammonia . . . The ammonia plant is of Chemical Construction Corp. (modified N.E.C.) design and will operate at approximately 5,000 psi. pressure on a synthesis gas composed of three parts hydrogen and one part of nitrogen.

Natural gas will be catalytically reformed in the presence of steam to produce hydrogen, carbon monoxide, and carbon dioxide. To this mixture will be added nitrogen—major component of air. The mixture of gases will then pass through a series of scrubbers and compressors which will purify the mixture so that at the entrance of the synthesis stage only the two reacting components will remain. High-temperature and high-pressure synthesis of hydrogen and nitrogen to the final ammonia is accomplished in the presence of a catalyst, and the ammonia will be recovered in a refrigeration system. The ammonia will then be available for direct sale as anhydrous ammonia and for the synthesis of further products.

Ammonium sulfate . . . Ammonia is used as a raw material, along with sulfuric acid, in the production of the sulfate. The system used at Houston feeds the raw materials into a mother liquor, which forms a supersaturated solution of the sulfate. Crystals of ammonium



AMMONIUM SULFATE CRYSTALS recovered from the supersaturated solution in the settler are then dried in this rotary drier, prior to being placed in storage.



SCHEMATIC FLOW DIAGRAM of the wet process for the manufacture of ammonium sulfate. Product crystals are recovered from supersaturated solution.

sulfate form, and these plus the mother liquor are sent through a centrifuge where the crystals are recovered and the mother liquor reused in the process.

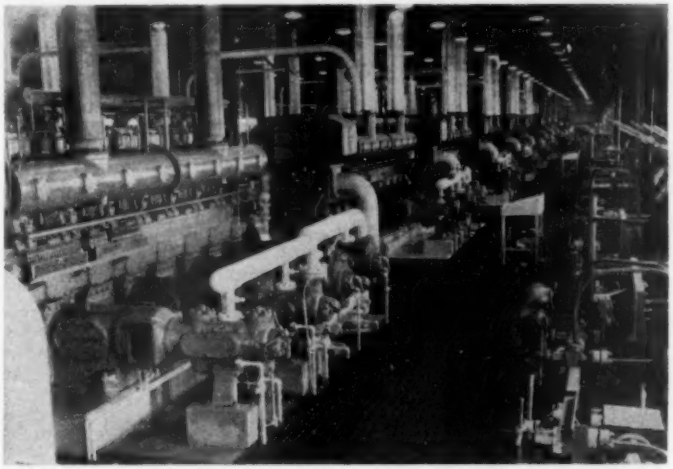
$$2NH_4OH + H_2SO_4 \rightarrow (NH_4)_2SO_4 + 2H_2O$$

Ammonia is passed into the acid solution saturated with ammonium sulfate, which solution is maintained at the boiling point by heat of neutralization. Vapors evolved from the solution contain some ammonia, which is scrubbed out by passing it through an absorber countercurrent to the sulfuric acid entering the saturator.

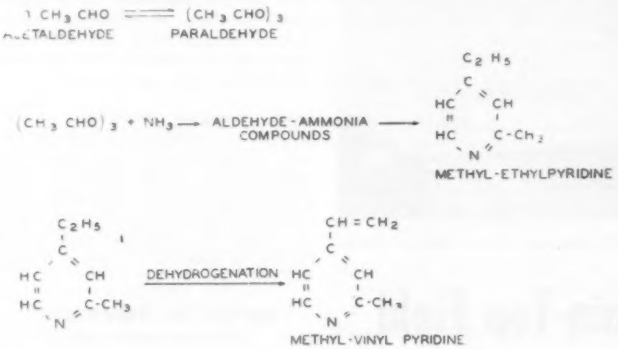
The saturated solution is withdrawn to a settler where the suspended crystals are allowed to settle out and the solution returned to the saturator. The crystals are centrifuged and dried in a rotary drier.

Pyridines . . . In the new pyridine plant, ammonia will also be used as a raw material to produce the principal products of methyl ethylpyridine and methyl vinylpyridine. Associated byproducts will be picolines and lutidines.

The pyridines are synthesized by reacting, under controlled conditions, ammonia and purified paraldehyde, which is made by the trimerization of acetaldehyde (Equation 1). Primary product of this reaction is methyl ethylpyridine (Equation 2). Part of this will then be catalytically dehydrogenated to methyl vinylpyridine (Equation 3). A separation process is involved to remove the byproducts.



EXTENSIVE COMPRESSION FACILITIES are required in the synthesis of ammonia, as shown by these installations at Phillips' Etter, Tex., plant. The Houston plant will require similar facilities.



Phillips Chemical . . . The organization of Phillips Chemical Co., a wholly owned subsidiary of Phillips Petroleum Co., took place in 1948 as Phillips took steps to become a major participant in the field of petrochemicals. In the latter part of the year, the company acquired a 339-acre site on the Houston Ship Channel upon which was constructed the original sulfate plant.

Personnel at the Houston plant include: R. G. Rhodes, plant superintendent; G. K. Young, maintenance superintendent; J. B. Scott, process superintendent; G. B. Keeler, personnel director; J. J. Costolow, chief chemist, and J. V. Lewallen, chief engineer.

CUTTINGS ARE BLOWN from the surface hole at one South Mountain well.

Air Drilling Solves Lost-Circulation

LOOKING EASTWARD along the ridgeline of South Mountain. Four islands previously completed are shown.

Problems of Mountain-Top Field

"Because of its success at South Mountain, Shell may employ air drilling in other California fields where the method's limitations do not preclude its use." Limitations? Water in formations, and unstable formations.

USE of compressed air as a circulating and bit-cooling medium proved highly successful for Shell Oil Co. in drilling the surface holes of wells in South Mountain field near Santa Paula, Calif. During the course of this work, reaming, washing over, drilling around, and fishing operations were performed with air as the circulating medium.

Air drilling was tried because a severe lost-circulation condition in the near-surface formations of the mountain-top field made use of rotary muds too expensive. Cable-tool drilling likewise had proved too slow and costly.

From data gained in drilling twelve 12¼ and 15-in. surface holes to depths of 600 to 1,000 ft., representing a total of 9,700 ft. of air drilling, Shell engineers estimated the technique was about 50 per cent cheaper than cable-tool drilling. The savings were in reduced drilling time: using air most of the holes were drilled and surface casing set in 36 to 72 hours whereas the best time made by a spudder was 18 days.

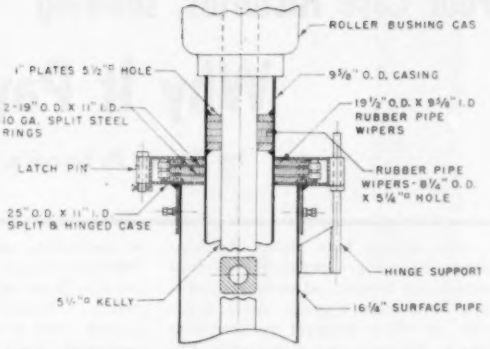
Penetration rates made with air at South Mountain were about twice those normally achieved with rotary muds in drilling the surface holes of wells in nearby fields. In general, bit consumption was only about one-half that experienced in conventional rotary drilling.

Because of its success at South Mountain, Shell may employ air drilling in other California fields where the method's limitations do not preclude its use. These limitations, which will be discussed later, are: (1) presence of water in the formations to be penetrated, (2) unstable formations which cave when the walls are not mud-caked, and (3) hole size is limited to about 15 in.

South Mountain problems . . . The combination of difficult terrain and lost mud circulation for years made development of South Mountain about the most difficult in California. The mountain rises steeply from surrounding valleys to a height of about 2,200 ft., but in places at the top it is only

by D. H. Stormont
West Coast District Editor

FIVE OF NINE compressors used to supply 4,180 ft. of air per minute to the air-drilled surface hole.


ROLLER BUSHING CAS
1" PLATES 5½"D HOLE
9⅝" O. D. CASING
2-19" O.D. X 11" I.D. 10 GA. SPLIT STEEL RINGS
19½" O.D. X 9⅝" I.D. RUBBER PIPE WIPERS
LATCH PIN
RUBBER PIPE WIPERS - 8¼" O.D. X 5¼"D HOLE
25" O.D. X 11" I.D. SPLIT & HINGED CASE
HINGE SUPPORT
5¼"D KELLY
16¼" SURFACE PIPE

KELLY PACKOFF assembly devised by Shell to keep cuttings from being blown through rotary onto derrick floor.

about 30 ft. wide. Shear cliffs and steep slopes make it economically unfeasible, if not physically impossible, to develop portions of the field from single-well locations.

To tap the thick Sespe (Oligocene) producing section which lies some 4,000 or 5,000 ft. below, in 1946 the practice of using multiwell "islands" was adopted. From these islands carved in the flanks of the mountain, as many as nine wells have been drilled. Some Shell wells have been bottomed around 1,300 ft. laterally from the island.

South Mountain wells are started in the Sespe formation and bottomed in it. Of nonmarine deposition, it dips at about 45° and consists largely of nonmarine sands, siltstones, and varigated colored claystones. The near-surface strata contain highly fractured shales and broken volcanics. It was in these upper formations, down to about 1,000 ft., that Shell encountered the most serious problem of maintaining mud circulation.

Late last year when Shell started development of the mountain-top properties it had purchased from F. E. Fairfield earlier in the year, rotary drilling with mud first was attempted. Because of the lost-circulation problem it was soon found to be impractical. At one well cracks in the highly porous formations had to be cemented off six different times during the first 600 ft. of hole.

Cable tools then were tried but the method was extremely slow and difficulties were met in maintaining straight hole. A few 15 and 18-in. surface holes were successfully drilled in this manner, the fastest time for any one being 18 days. At one well where a substantial thickness of igneous rock was encountered, 18 days were spent in drilling to 242 ft. and the spudder was unable to dig deeper.

Drilling hookup used . . . In converting to air drilling only minor changes were made in the drilling equipment, which was a contract rig of Bell & Burden, Inc. In place of the mud pumps, nine air compressors were generally used. These consisted of six 500, two 365 units, and one 315 cu. ft. per minute units. All were single stage with a discharge pressure of 105 psi. Each compressor was individually governed.

The compressors were connected through 2-in. rubber hose to a 6-in. header and a 4-in. pipe carried the air to the 3-in. standpipe. A valve placed in the 4-in. line at derrick-floor height enabled the supply of air to be cut off each time drilling was halted for the purpose of adding a joint of drill pipe, or for any other reason. No changes were made in the swivel hookup.

Standard rock bits were used in drilling the first three holes. In order to provide greater air circulation in the other nine holes drilled, however, the bits were cut out to provide as large an air passage as possible. This increase in size of the air outlet was found to improve materially bit performance, principally by keeping the bit teeth freer of cuttings. Normal circulation was used at all wells.

To prevent the fine dust and cuttings from escaping onto the derrick floor and becoming a hazard to the drilling crew, the kelly packoff assembly shown in Fig. 1 was devised. A section of 9⅝-in. casing was welded to the kelly bushing so that it rotated with the kelly and was run into and out of the hole with the bushing. To pack off the annular space between the kelly and the section of casing, rubber pipe wipers were fitted between 1-in. steel plates and the latter welded in place.

To cap the 16¼-in. surface pipe a split cover containing three pipe wipers of 9⅝-in. i.d. was employed. Steel spacer rings with an 11-in. i.d. were used to stiffen the rubbers. Hinged on one side, a latch pin on the other side was removed whenever it was desired to open the hood.

A 10¾-in. air return line was used to remove the cuttings from the hole and deposit them a short distance away. Bends in the return line were streamlined in order to reduce flow resistance.

Drilling performance . . . Before drilling was started, Shell made a study to determine what would be the most desirable rising velocity to use in drilling the 1,000-ft. holes. With the volume of air available, some 3,500 or 4,000 cu. ft. per minute, and a discharge pressure of about 100 psi. at the bit, it was determined that a 90-ft. per second rising velocity was about right for keeping the hole free of cuttings. A velocity of about 68 ft. per second was found to be a minimum under these conditions.

To attain these velocities it was decided to use 6⅝-in. full-hole drill pipe for drilling 12¼-in. holes. This program worked out very successfully; rapid penetration was secured and the cuttings quickly circulated to the surface.

At one island where the walls stood up well it was decided to attempt the drilling of a 15-in. hole. Since the larger hole resulted in about a 30 per cent drop in return air velocities, a string of 9⅝-in. washover pipe was substituted for the drill pipe. This pipe was internal flush, acme threaded, and had a slight external upset. This sizing also worked well and the washover pipe was used to drill two more 15-in. holes, one of which was unsucceessful.

In drilling the surface holes a rotary speed of about 150 r.p.m. was used.

(Continued on page 93)

Four Case Histories, showing

Why It Pays to Unitize

by Bruce A. Landis, Jr.,* and L. E. Brock*

The authors here report the economic advantages pertaining to four actual case histories of unit operations. The four case histories cover reservoirs of widely different characteristics and in various stages of depletion. The report is from a paper presented before the recent annual meeting of the North Texas Oil and Gas Association, Wichita Falls, Tex.

Preface of the paper included discussion of general economic advantages of unitization, including . . . Better utilization of gas . . . Transfer of allowables from high to low-gas-oil-ratio wells . . . Storing produced gas underground until a market is developed (meanwhile maintaining reservoir pressure at higher levels) . . . Reduction in operating and development costs . . . Elimination of duplicate camp gas, water, and other facilities systems, tankage, pipe lines, administrative systems, etc.

Case History of Unit A

THIS volumetric-type reservoir, approaching the economic limit of production, was unitized in order that a pattern water flood could be conducted.

The reservoir is a monoclinic trap. A fault trending northeast-southwest bisects the field, but studies indicate that there is communication of the porosity across the fault line. Fig. 1 is an east-west cross-section of the Pennsylvanian pay sand along a line which approximately corresponds with the major axis of the field.

Dimensions of the field are 2 miles east and west by ¾ mile north and south.

Discovered in August 1946, the field as of October 1, 1950, had produced approximately 11 per cent of the initial oil in place from 57 producing wells located on 10-acre spacing. It was estimated as of that time that about 89 per cent of total primary reserves had already been produced.

Reservoir and fluid characteristics . . . Data were found as follows:

Initial bottom-hole pressure, psi.	914
Initial solution gas-oil ratio, cu. ft. per bbl.	238
Average porosity, per cent	18
Average permeability, md.	150
Connate water content, per cent	13

There was no natural water drive or gas cap. No water except a negligible quantity of connate water had been produced in the field. The only production problem of consequence was paraffin accumulation in tubing and flow lines.

Because of the foregoing demonstrated inefficiency of primary depletion, an investigation of the field was made to determine if a program for increasing ultimate oil recovery could be found. Engineering studies showed that a water flood, in which 23 of the existing wells would be utilized for injection, would be economical.

It was decided that a modified five-spot pattern was best suited to the plan of recovery and that no additional drilling of wells would be necessary if the field were unitized. It was further concluded that secondary operations were not desirable unless a unit was formed because:

1. Many wells were at the plugging stage and redrilling of the individual tracts was not justified because of the drilling cost of the wells.

2. A successful unitized flood would yield both remaining primary and secondary oil in approximately the same time as would be required to recover the remaining primary oil.

3. Elimination of the need to restrict fluid movement across lease boundaries within the unit would result in a greater recovery at less investment cost than individual or cooperative programs.

Accordingly, the 730-acre area owned by eight operators and shown in Fig. 2, was unitized.

Recovery . . . A summary of the engineering studies is shown in Fig. 3, which is a comparison of the predicted

*Unitization section, Stanolind Oil & Gas Co., Tulsa.

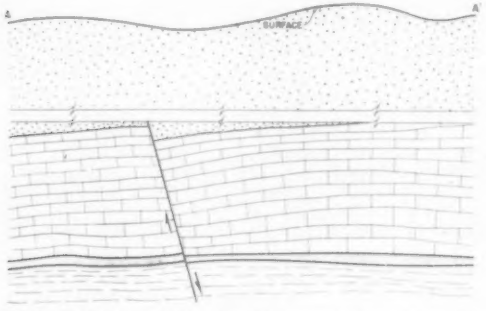


Fig. 1—Unit A has a fault present in reservoir, but porosity communicates across it.

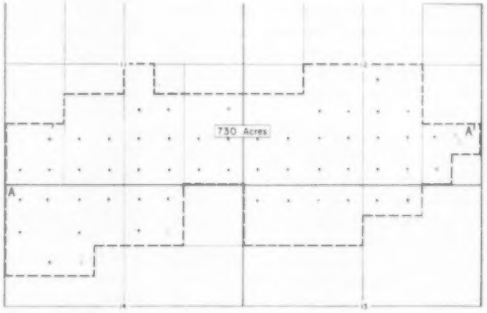


Fig. 2—Eight operators joined in Unit A; 23 of the existing wells were then utilized for water injection on a modified five-spot pattern.

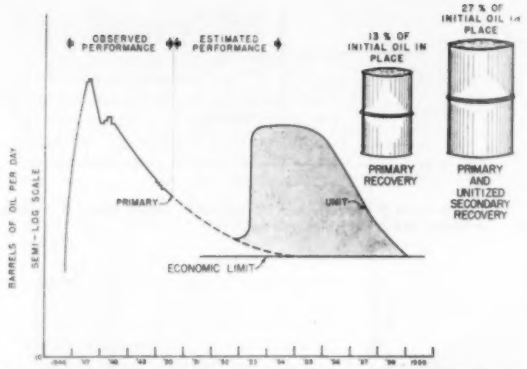


Fig. 3—Comparison between primary field decline and subsequent performance for Unit A.

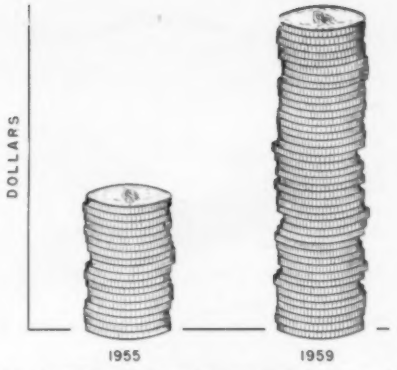


Fig. 4—Profit comparison between competitive secondary and unitized secondary recovery (Unit A).

decline curves for primary competitive and unitized secondary depletion of the field. By the former, about 13 per cent of the initial oil in place would have been produced by 1955, whereas by the latter about a 27 per cent recovery of the initial oil in place is anticipated by end of 1959. This is an oil-recovery increase of 108 per cent.

Costs of Program

It can be shown that the unitization program in this field will effect the recovery of the anticipated 108 per cent additional oil in the least expensive manner.

Flood water . . . The nearest surface supply is about 4½ miles from the field in an area of seasonal drought, therefore suitable only as a last resort. Initial investment, maintenance, and operating cost of such a gathering system over the life of the flood would have approximated 18 per cent of estimated unit profits.

It was found that three shallow water-supply wells could be put into operation at a considerably lower investment. Peak unit requirements were estimated at less than 5,000 bbl. of water per day, and these three wells would provide a supply dependable at all times.

On an individual lease basis at least eight supply wells would have been needed. This cost, together with additional producing or injection well cost, would have made individual projects prohibitive, especially so for the edge leases.

Total water-injection costs including those of investment, maintenance, and operations were estimated to be about 24 per cent of total initial unit investment. Between 3 and 4 million barrels of water will be injected into the producing formation, and the cost is expected to be well below 5 cents per barrel. This is certainly less than could be expected on an individual lease basis.

Over-all economics . . . The total investment expense, including conversion and testing of wells, was quite small. A sum equal to about five times initial investment was estimated as direct operating expense. Summation of the various unit investment items indicated a ratio of profit to total unit investment of about 7 to 1 before taxes.

Contrast this with the state of the field as of October 1950. In the first 6 months of 1948 lifting costs per barrel of oil had suddenly risen sixfold, principally because of the extremely rapid production decline. This situation had become worse by 1950, and with primary depletion the operating costs per barrel would have continued to increase because of continued production decline.

The cumulative effect of individual floods could not approach the recovery figures as outlined from the unit. In the first place, without unitization large volumes of oil would be untouched by the flood because several operators would not have attempted floods that required an investment for additional wells. Secondly, large volumes of oil susceptible to movement across lease boundaries under a unit flood would not be moved under a competitive flood for no operator will voluntarily push oil to a neighboring operator. And, thirdly, interference between floods would have isolated oil away from the well bore.

A summary such as made here clearly indicates that the formation of Unit "A" was the most economically beneficial way to attempt further recovery in the field. Every field study pointed to the alternatives of unit operation or early abandonment. Fig. 4 shows the comparison in dollars between the profit which could have been expected from competitive secondary recovery operations and the profit conservatively expected from unitized secondary operations. It may be noted that profit from the unitized operations exceeds by 100 per cent that of competitive operations.

Each royalty working-interest owner committed to the unit will receive his proportionate share of the proceeds upon a more equitable basis than would be possible under competitive production methods. The unit production, regardless of where in the unit it is produced, will be divided in accordance with the basis of participation, established in this case by exhaustive engineering study and negotiation.

Case History of Unit B

Analysis of the Unit "B" reservoir showed that competitive primary producing operations could be conducted for 17 years after 1950 before the economic limit of production would be reached. But this analysis also showed that in an additional 13 years the ultimate oil recovery could be increased 60 per cent with a unitized dispersed-type gas-injection program.

The reservoir is an elongated, bidomal, east-west trending anticline, and Fig. 5 is an idealized cross-section of the pay zone along the axis of elongation. There do not appear to be any communication barriers existent within the pay and the permeability is quite uniform. However, permeability conditions are such that it is necessary to acidize.

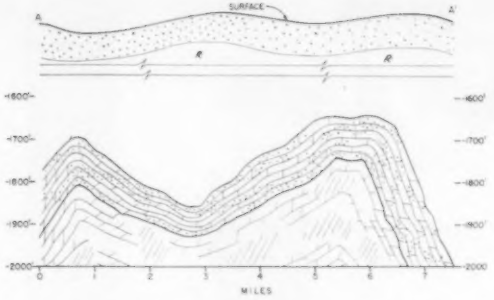


Fig. 5—Reservoir cross-section for Unit B.

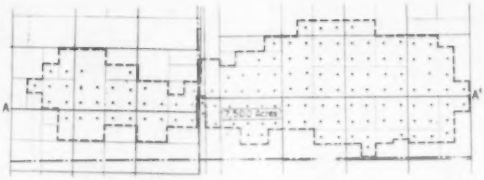


Fig. 6—Unit B formerly had 72 separately owned tracts, 8 working interests, and 231 royalty interests.

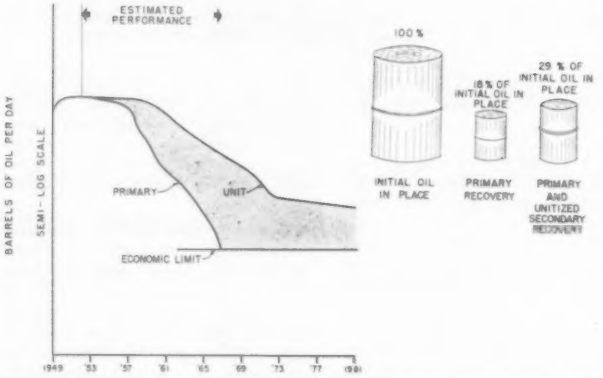


Fig. 7—Comparison between primary field decline and subsequent performance for Unit B.

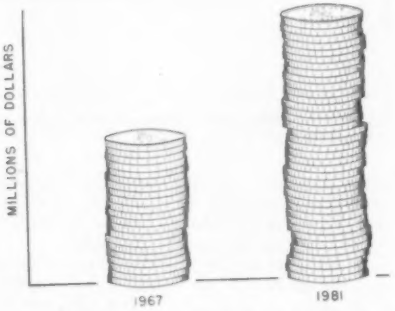


Fig. 8—Revenue from primary secondary operations versus same for Unit B.

Initial discovery in the pool was in 1944, and the pool productive limits were extended in 1946. By January 1949 there were 116 wells on 40-acre spacing producing 8,600 bbl. of oil per day by artificial lift. Small amounts of water are produced with the oil in some portions of the field but no uniformity of water table has been found. It has been concluded, in view of the production history of the pool, that fluid expansion and dissolved gas are the sole sources of reservoir energy. The oil had an abnormally low solution gas-oil ratio, only about 150 cu. ft. per barrel.

After engineering and economic studies, the area shown in Fig. 6 was selected for unitization. About 7,500 surface acres are included within the unit area, representing 72 separately owned tracts. Eight working interests and 231 royalty interests were combined to effectuate the formation of the unit.

The decline curves shown in Fig. 7 will illustrate the expected advantage of unitized gas injection over primary depletion. About 18 per cent of the initial oil in place would have been produced by 1967 (the abandonment date) under primary depletion. On the other hand, with the unitized gas-injection program now in operation, an additional 11 per cent of the initial oil in place will have been produced by 1981. The total recovery with this program will be about 29 per cent of the initial oil in place. Doubtless too, before the field is finally abandoned, some other form of secondary recovery will be applied to the field in an attempt to reduce the estimated 71 per cent residual saturation to a lower figure.

"Economics will be reckoned in billions of dollars."

The economics of competitive primary and unitized gas-injection operations for Unit "B" are summarized in Fig. 8. The expected gross revenue after January 1950, with unitized gas injection, exceeds that for primary competitive operations by a ratio of 1.84 to 1, an increase of 85 per cent.

The net profit before income taxes (after January 1950) for unitized gas injection is in excess of that for primary competitive operations by a ratio of 1.74 to 1. This is a 74 per cent increase. To obtain this 74 per cent increased profit a total capital investment of less than 2½ per cent of anticipated increased profit was required initially. Ultimately this may be increased to in excess of 7 per cent.

Benefits as outlined for Unit "B" would appear to exceed materially any benefits to be gained by competitive secondary operations. One reason is that individual secondary programs would probably not have been instigated until at or near the primary depletion stage, at which time the reservoir pressure would have dropped far below the bubble-point pressure of 485 psia. Thus many of the lighter hydrocarbons would have been separated from the oil in the reservoir, causing oil to be lost through shrinkage; also, oil viscosity would increase materially.

The Unit "B" discussed above is a petroleum-industry undertaking of large magnitude. Millions of dollars and millions of barrels of oil are involved, but this is by no means an indication that the pinnacle of achievement has been reached. Some really "big timers" are in the formative stage at this very moment. One of these, encompassing more than 50,000 oil-productive acres, has set its sights toward an additional oil recovery of more than 700,000,000 bbl., which is at least a 125 per cent increase over primary competitive recovery. The economics of such a program will be reckoned in the billions of dollars.

Case History of Unit C

The pay zone of the reservoir is shown in cross-section in Fig. 9. An upper and a lower pay of pre-Permian fractured chalky chert and lime are separated by a dense zone of impermeable limestone. Water-oil contact on the west, a fault on the south, a porosity pinchout on the north, and truncation on the east define the productive limits.

The degree of the producing formation dip indicated that it was feasible to attempt the formation of a secondary gas cap at the top of the structure which would effect downdip migration of oil to wells lower on the structure. The crude is characterized by a very high solution-gas content of about 1,200 cu. ft. of solution gas per barrel of oil, which will provide more than sufficient gas for the formation of the gas cap.

An area comprising about 3,700 acres, consisting of 14 separately owned tracts controlled by three operators, was unitized (Fig. 10). The operators of an area contiguous to the unit, as shown by the figure, will cooperatively inject gas with the unit—a practice that detracts considerably from the over-all picture of benefits which could have been derived if this contiguous area were included within the unit; but since it was not possible to unitize the entire area, the next best thing was done, and some injection cost reduction will be possible through use of the common facility.

Recovery . . . Fig. 11 shows the bottom-hole-pressure decline of primary operations as compared to unitized secondary recovery operations. The pressure maintenance will ultimately allow about 36 per cent of the initial oil in place to be produced. Were the portion of the field within the unit permitted to decline at its natural rate, only 23 per cent of the initial oil in place would have been produced. With 75 per cent of the produced gas returned to the reservoir, the 36 per cent of the initial oil in place estimated to be produced by the time bottom-hole pressure is 300 psia., is a recovery increase of 55 per cent.

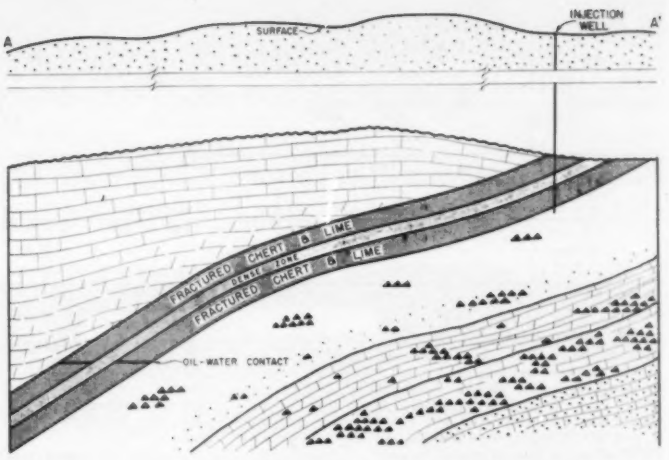


Fig. 9—Reservoir for Unit C has both upper and lower pays of pre-Permian fractured chalky chert and limestone.

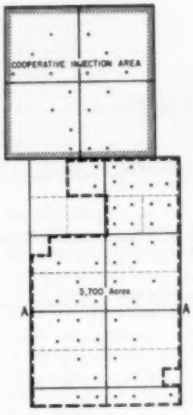


Fig. 10—Unit C and adjoining cooperative area.

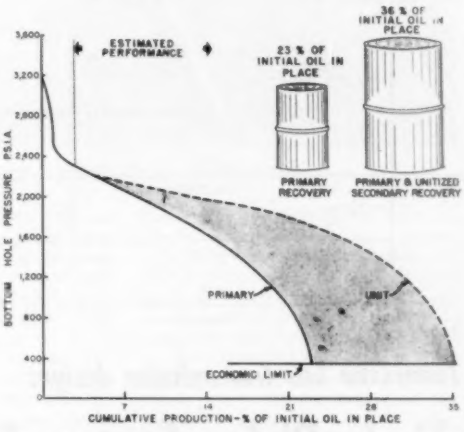


Fig. 11—Bottom-hole pressure decline and oil-recovery data for primary decline and Unit C operations.

Case History of Unit D

Only one working-interest owner and three royalty owners are involved in Unit "D," which makes it somewhat unusual, though perhaps not unique. Unit "D" is distinguished also by the fact that there are currently both gas-injection and water-flooding programs being conducted.

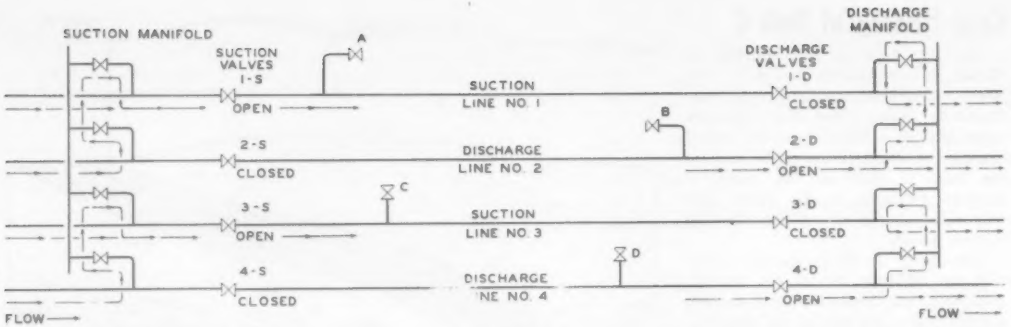
A plan of the unit area is shown by Fig. 12, and Fig. 13 is a cross-section of the Oligocene pay sands of the reservoir which shows the position of the sands on the flank of a salt dome.

The gross production and revenue for primary recovery as compared to that for the unitized recovery program now in operation for all three sands are shown in Fig. 14.

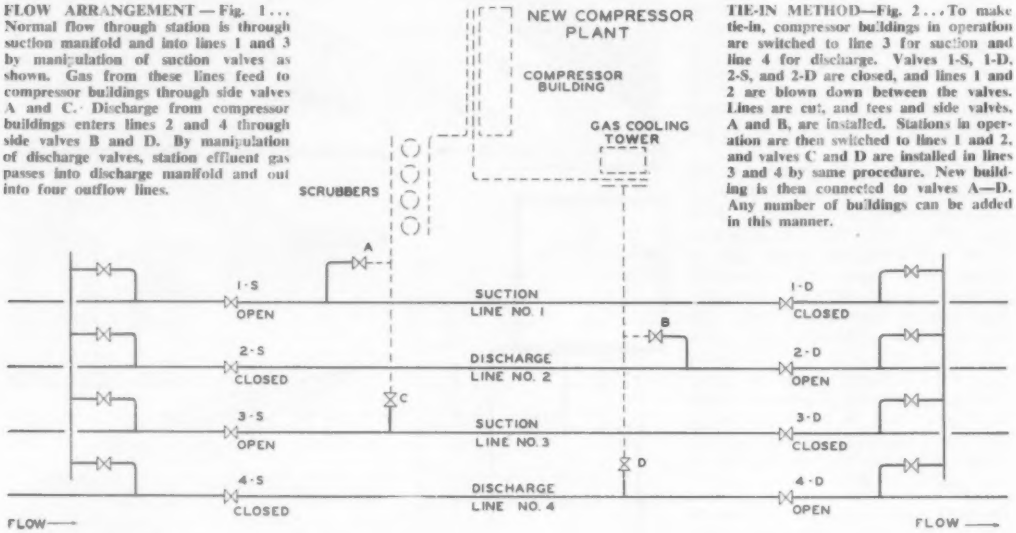
Engineering . . . There is one operational feature of interest being conducted in the upper sand, which probably would not have been attempted if the field had not been unitized. It will be noticed (Fig. 13) that the gas-

(Continued on page 90)

Fig. 12—Unit D, where the operator is conducting both gas injection and water flooding.



FLOW ARRANGEMENT — Fig. 1 ... Normal flow through station is through suction manifold and into lines 1 and 3 by manipulation of suction valves as shown. Gas from these lines feed to compressor buildings through side valves A and C. Discharge from compressor buildings enters lines 2 and 4 through side valves B and D. By manipulation of discharge valves, station effluent gas passes into discharge manifold and out into four outflow lines.



TIE-IN METHOD—Fig. 2 ... To make tie-in, compressor buildings in operation are switched to line 3 for suction and line 4 for discharge. Valves 1-S, 1-D, 2-S, and 2-D are closed, and lines 1 and 2 are blown down between the valves. Lines are cut, and tees and side valves, A and B, are installed. Stations in operation are then switched to lines 1 and 2, and valves C and D are installed in lines 3 and 4 by same procedure. New building is then connected to valves A—D. Any number of buildings can be added in this manner.

Tennessee Gas Transmission designs

Tie-In Piping System Featuring Flexibility, Safety

System meets all major requirements of practical design, with no sacrifice of strength

A TIE-IN piping system which permits the orderly addition of loop lines and compressor buildings at compressor stations has been developed by Tennessee Gas Transmission Co.

The system meets all major requirements of practical design, in that tie-ins can be made with no sacrifice of design strength or service curtailment. Costs will be considerably less than with the conventional system by the time the installation has reached a size of three compressor buildings and three pipe lines.

Basic design of this new piping system includes four complete pipe lines across the compressor yard using two main-line block valves in each pipe line in place of the conventional single block valve. Located at the extreme limits of the plant site, these block valves are beyond any point where it would ever conceivably be desired to build more compression facilities. A crossover manifold is built at each end of the plant yard and is tied in to each pipe line on the pipe line side of the block valve.

It will be seen from Fig. 1 how the installation is made and operated. Valve operation is as follows:

The block valve on Line No. 1 (marked 1-S) on the suction side of the plant, is left open while the block valve (marked 1-D) on the discharge side of the plant is left closed. Line No. 3 is treated in the same manner. The reverse is applied to Lines 2 and 4, i.e., the block valves on the suction side of the plant are closed and the block valves on the discharge side left open. All of the crossover manifold valves are open.

By means of the suction manifold the incoming flow of gas from four lines is combined into two streams flowing into the plant yard in Lines 1 and 3. Suction pressure thus will exist across the plant yard as far as the block valves located on the plant's discharge side.

In the same way, the discharge gas from the plant flows out on Lines 2 and 4 only, through the open block

SUCTION MANIFOLD at one of Tennessee's compressor stations is for a three-pipe-line tie-in. Foreground shows elevated gear housing valve equipped with operator, operator-equipped blowoff and pipe-line blowoff.

TYPICAL PIPING CONNECTIONS for tying compressor building to the new manifold system.

valves, and is distributed by the discharge manifold to load the four pipe lines leaving the plant. So, regardless of where a compressor building is built between the two block valves on each line, two suction lines exist to tie to and two discharge lines to tie to, eliminating the need to construct any piping parallel to the main line.

Fig. 2 shows the manner of tying in a compressor building to these four pipe lines. It is done as follows:

The block valve (1-S) is closed and the section between 1-S and 1-D in the plant yard is blown down. This line is cut, a tee and side valve are installed; the side valve is closed; valve 1-S is reopened and the line is put back in service.

While this No. 1 line is shut down, the side valve which provides suction to any other previously constructed compressor building will naturally be closed. However, the other plants will obtain suction from the tie-in connection to Line No. 3, and all pipe line and plant facilities thus will continue operations while Line No. 1 is shut down within the station yard.

A slight decrease in system capacity results, of course, from the extra pressure drop caused by combining the flow of all the gas through Line No. 3. But this drop is not too severe. And economically a great saving results over the loss which otherwise would occur from shutting down a 10 to 12-mile valve section of the main line to do the same job without the dual block valve installation.

Proceeding in a similar manner, Line No. 3 is shut down between the 1 block valves and the other suction valve for the new plant is set. When this is done, the same process is repeated on Lines 2 and 4 setting the new discharge tie-ins for the new compressor facilities. All main line work in the plant yard, either the tie-in of new compressor facilities, maintenance or repair can be accomplished by taking the affected line out of service. The work can be done safely and without serious reduction of the pipe line system capacity.

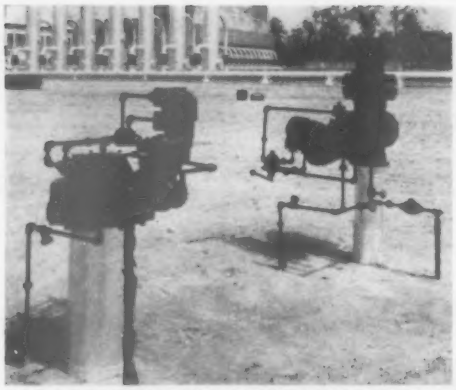
Under this system, no longer do the scrubbers have to be located on the upstream side and the cooling tower on the downstream side of a single main line block valve. They can now be located anywhere between the block valves irrespective of the direction of main line flow, without complicating the plant piping pattern, and still have a good tie-in connection. This flexibility permits much more latitude in the location, arrangement and interconnection of all the plant facilities, since the direction of the flow in the main line can be disregarded.

To bypass the plant, it is only necessary to open the four closed main line block valves. This makes each pipe line a thoroughfare line through the plant. The plant may be isolated from the main line and blown down if desired, by closing the suction and discharge valves for the individual compressor buildings.

It is not contemplated for future pipe line expansion that there ever will be more than four lines laid across the plant yard. Any fifth line loop would be tied into the suction and discharge manifolds only, and not continued across the plant yard. The manifold must be taken out of service to extend it for the tie-in, and while it is out of service, two pipe lines will be blocked off from the plant. But they will be out of service only to the next main line valve installation where cross-overs are installed. While a slight operations curtailment will result from taking two valve sections out of service, no blow down of these lines is needed and no appreciable gas loss will result from the tie-in.

Plant Shut Down

A simple, reliable remote control system to shut down the plant in an emer-



MAIN LINE AND BLOWOFF VALVES (left) are of the lubricated plug type. Main-line valve is operator equipped, with elevated gear housing. REMOTE CONTROL INSTALLATION (right) operated manually, is used for emergency shutdown.

gency has been made possible by this piping arrangement. As shown in Fig. 2-A, all gas enters the plant through the main line section block valves marked 1-S and 3-S. Likewise all gas leaves the plant through two valves, the main line discharge block valves marked 2-D and 4-D. Closing these four valves completely isolates the compressor plant from the pipe line.

Since closing only four valves will isolate the plant only four valve operators are required in this piping system. It is therefore very simple to maintain this small number of operators, and the possibility of an operator failing to work has been correspondingly reduced. Even in the event of a failure of one of the four operators to perform, the operator-equipped valves can still be reached to be manually closed without danger to the personnel because these valves are located at the extreme limits of the plant site, usually a distance of 1,500 to 2,000 ft. apart.

Each main line is equipped with an 8-in. blow-off valve which is operator-equipped. These blow-off valves are connected to the control piping in parallel with the operator-equipped main line block valves. Thus these blow-off valves start opening as the main line valves begin closing, and the plant blow-down is started immediately upon activation of the control system.

Valve operators which were available at the time the remote control system was designed were rejected due to various control features or mechanical problems which were considered detrimental to reliable operation. At Tennessee's request two operator equipment manufacturers designed a new style operator consisting of a 1,000-psi. working pressure, high-speed, vane-type gas motor which, through a set of reduction gears, drives the hand wheel shaft of the valve.

This drive is positive throughout with no declutching arrangements. Limit valves to shut off the gas supply when the valve has reached the closed position are a glove or slide type valve, spring loaded in the open position and closed by a cam which is mounted either on the main plug shaft of the valves or driven through a set of reduction gears driven from the valve hand wheel shaft.

These limit valves are spring-loaded in the open position so that they cannot be manually closed and left closed through oversight or neglect. A five-way manually operated reversing valve is provided to reverse the direction of valve travel. This five-way valve is spring loaded in the emergency-run position, i.e., to close the main line valve and to open the blow-off valve such that this valve cannot be left in the wrong position.

The operators will close the main line block valves in from 10 to 15 seconds and will open the blow-off valves in about 5 seconds. The plant can be shut down and blown down in approximately 2 minutes.

Remote Control Piping System

Gas supply is obtained by a tap on the discharge manifold to use the highest pressure available, then through a 1½-in. supply line is conducted into storage bottles through a check valve. A check valve is provided to insure that a pipe line failure will not bleed off the gas reserve necessary to operate the remote control system. A line from the storage bottles then goes to a manually operated valve which is normally closed. This valve is the system's activating valve and is called the remote control valve. The system to this point is always pressurized.

From this valve the gas is piped to the four main line valve operators and

"... to prevent an excessive pressure buildup on discharge side ..."

the four blow-off valve operators all of which are connected in parallel. Opening the remote control valve admits gas to all operators at the same time and there are no other valves between the remote control valve and the operators which can be left closed accidentally or otherwise.

Additional Safety Features

Three additional safety features are incorporated in the remote control system to prevent an excessive pressure build up on the discharge side of the engines in the event the blow-off on the discharge side of the plant fails to open as the discharge block valves are closed.

The first of these safety features is two 8-in. relief valves mounted on the main line discharge lines before the block valves. These relief valves provide sufficient capacity to relieve the pumping capacity ability on all the engines.

The second safety feature consists of relief valves mounted on the discharge side of each individual compressor engine.

The third safety feature consists of a shut down system to shut off the compressor engine ignition which is fed from the main plant switchboard through rectifiers. This system is activated in the following manner:

A Mercoid switch is mounted on the remote control piping system on the outlet side of the remote control valve. The same gas pressure which operates the main line valves and blow-off valves will close the Mercoid switch. An electric circuit fed from the 440-volt, 3-phase main plant bus is completed through the Mercoid switch and energizes trip coils installed in the main switchboard circuit breakers which supply the compressor engine ignition system. As these circuit breakers are tripped all of the compressor engines in the plant are shut down.

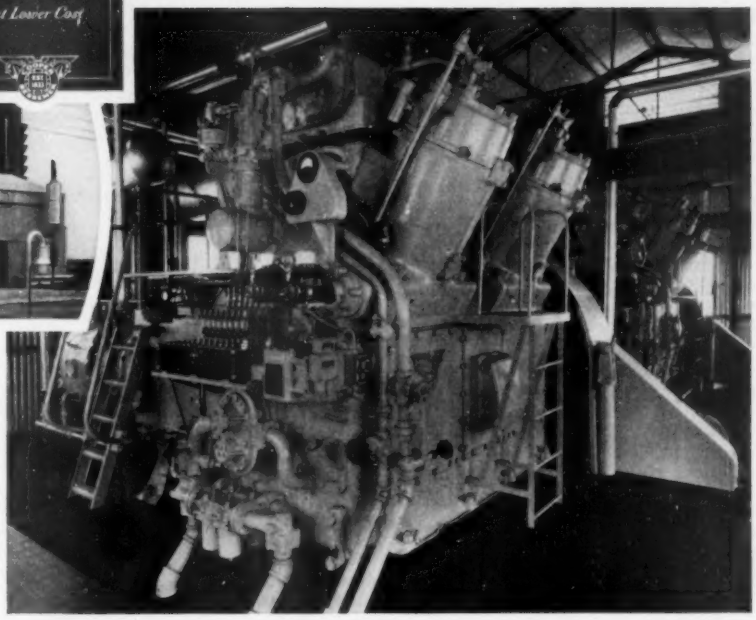
Additional safety precautions to help prevent the possibility of fire in the event of escaping gas in or near the compressor building consists of additional trip coils mounted on the circuit breakers which supply all of the light and power to the compressor building.

Thus all electrical wiring in the compressor building is de-energized when the remote control system is activated. These circuit breakers are all equipped with dead-man type by-pass switches so that the performance of these breakers may be periodically checked without shutting down the plant. Since these switches are spring loaded in the off po-

Another Example of Efficient Power at Lower Cost

These automatically controlled, 2-stage, 440 hp Cooper-Bessemer compressors take field gas at 20 psi and discharge at 425 psi into the pipe-line system of United Gas. Inset shows exterior of this new Universoil booster station in the West Beaumont field. Installation was handled jointly by Deerfield Petroleum, Inc., and Universal Petroleum Co., Oil Well Supply Co. furnishing all equipment.

RIGHT: Close-up of the operating ends of the modern GMV's from the crank-door side. Unusual flexibility makes these units ideal for automatic operation.



More profit in gas conservation...

...WITH GMV ONE-MAN AUTOMATIC OPERATION

WHEN a booster station practically runs itself, month in, month out, gas conservation is bound to be more practical, more profitable! And that's the success story behind those Cooper-Bessemer GMV V-Angles, shown opposite, in Universoil's new station in the West Beaumont field.

These two GMV's are daily handling 4,800,000 feet of gas that ordinarily would be flared—doing it efficiently *with the attention of one man for each 24 hours of operation!* It's a good example of the adaptability of modern Cooper-Bessemer V-Angles to extensive automatic control. The installation features variable speed governors to meet wide load variations, as well as automatic shutdown devices on the cooling water and lube oil systems. Likewise, the inlet scrubbers have low-liquid-level dump and shutdown controls.

If you're planning compressor jobs from 220 to 3,000 hp, automatically controlled or otherwise, check on Cooper-Bessemer V-Angles—today's and tomorrow's answer to compressor performance at its best.

The Cooper-Bessemer Corporation

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San Francisco, Calif. Houston, Dallas, Greggton, Pampa and
Odessa, Texas Seattle, Wash. Tulsa, Okla. Shreveport, La.
St. Louis, Mo. Los Angeles, Calif. Chicago, Illinois Caracas, Venezuela

sition, they cannot be left in a position to by-pass the breakers and make the safety precaution inoperable.

In a multiple pipe-line system it is very difficult to determine which line of several has failed at the compressor station, since the lines are all equalized at the plant. Tennessee normally operates its system with the cross-over lines closed at its main line valve settings. Therefore, pressure is equalized only at the compressor station. Gages are mounted on each pipe line on the pipe line side of the suction and discharge manifolds. In the event of an emergency or pipe line failure on the main line, each line can be successively closed off from the plant and manifold, and by watching the action of the pressures shown on the gages, the leaking line can be quickly isolated from the system. Other lines and the plant can remain in service.

Tennessee's compressor stations are equipped with sound-powered telephone intercommunication system. This system has been extended to cover a phone at each manifold. Personnel operating the valves at the manifold are thus in direct communication with the station operator in the office, who in turn, by means of a short-wave two-way radio and lease line telephone facilities is in touch with the central office dispatcher.

Stronger Materials

Where materials were obtainable, in repiping Tennessee Gas' compressor stations to the system outlined, all pipe fittings, valves, etc, subject to high-pressure gas were installed to conform to the ASA B31.1 Code for Pressure Piping, to Division 1 standards of Section 2 of the code, or better. For plants operating at 760 psi. discharge all large-diameter high-gas-pressure gas pipe in the plant yard was either installed or relaid to the following wall thicknesses and diameters: One-half-inch wall thickness by 24 in.; ⅝-in. wall thickness by 26 in.; and ⅞-in. wall by 30 in.

Since the production pipe mills do not normally make pipe in wall thickness greater than ½ in. in these sizes, it was necessary for a considerable portion of the pipe to be manufactured by fabricators. This pipe being nonexpanded, was all stress-relieved and hydraulically tested. A new line of fittings was designed and manufactured to make the required connections possible.

All the materials in both the pipe and fittings were at least 42,000 psi. minimum yield material and all wall thicknesses were specified as minimum instead of nominal to obtain full strength throughout all fittings and pipe.

An actual plant piped by this method is Tennessee Gas' compressor station No. 8 near Batesville, Miss. Tennessee Gas plants all have been repiped to this system and the blow-down remote control system installed at each within the last 2 years. Some welding saddles and a small amount of light-weight pipe remain to be removed and replaced with specification material. The remainder of this work will be completed in the 1952 construction season. All basic elements of the manifold system are now installed, however.

"Tennessee Gas plants all have been repiped to this system. . ."

Background

Four major requirements must be met in designing a tie-in piping system to connect the main lines of a natural-gas transmission system with the compressor stations located along the system. They are:

1. The piping should be so interconnected that each compressor engine or building can pump suction from any of the several transmission lines passing through the plant yard.

2. A simple, reliable system to shut down and blow down the compressor plant in event of emergency should be incorporated.

3. The pipe and fittings should be structurally sound in order to stand up adequately under line pressures, various mechanical loads caused by changing pressures and temperatures, and vibration or fatigue loadings.

4. The piping should be flexible enough that additional pipe lines and compressors can be installed and tied in with existing facilities remaining in service and without using hot-tap valves.

Earlier Piping Practices

Basic features of plant piping practices followed by the industry in the past have been tie-in connections and valving consisting of a main line block valve and two side valves, including one for plant suction and one for plant discharge. This tie-in meets the four general requirements given above, but when one or more main line loops are added along with additional compressor buildings to pump the gas, difficulties arise.

The addition of the first loop line to the existing compressor station does not require a complex piping arrangement However, the tie-over lines to the first loop must cross the original lines. These large-diameter lines, if carried underground, would have to go rather deep so that several bends would be required to make the necessary changes in elevation. Two additional side valves are needed for the tie-in as well as a new main-line valve.

The addition of a second compressor station tied in to both pipe lines is rather complicated. This second building usually would be on the same side of the pipe line as the original building. Since the first building normally is built opposite the main line block valves, it is necessary to run a suction or discharge line from the new building parallel to the main lines for a considerable distance to get on the proper side of the existing main line block valves for suction or discharge tie-in.

Presuming both pipe lines are in service, the tie-in valves either must be installed by the hot-tap process or the lines must be taken out of service and blown down so the tie-ins can be made with regular valves. While these lines are shut down, a considerable service curtailment will result. And if hot-tap valves are used, they must be of smaller sizes, with consequent pressure drop within the plant yard piping. Still, the troubles encountered to this point are not especially excessive and when only two pipe lines and compressor buildings are involved, this remains a feasible method of connection.

When this pattern is extended to a plant yard with four compressor buildings and four pipe lines crossing the yard, major difficulties are encountered. Some of the considerable design and operational difficulties involved are:

1. Many hot-tap valves must be installed or many facilities shut-downs must be made.

2. Numerous cross-overs of large-diameter, high-pressure gas lines must be made involving a considerable number of pipe bends and the laying of some lines at excessive depths. Tie-in valves for one building must be located near to and sometimes among valves for another building.

3. Many valves must be installed so near the plant facilities that in event of a failure involving the facilities, it might be difficult or impossible to reach the facilities to operate them.

4. To isolate each compressor building from the pipe lines, if it is tied in to all four lines, would require operation of eight valves. Thus 32 valves must be operated to isolate a four-compressor-building plant, and in addition four main line block valves must be opened to by-pass the plant.

5. Because the future growth of the plant could not be envisioned at the time of the original construction, in most cases where compressor buildings are added to the plant it will be found that there will be light-wall cross-country pipe immediately adjacent to the plant facilities. Of course, this depends on the amount of heavy-wall pipe installed in the original main line through the plant yard.

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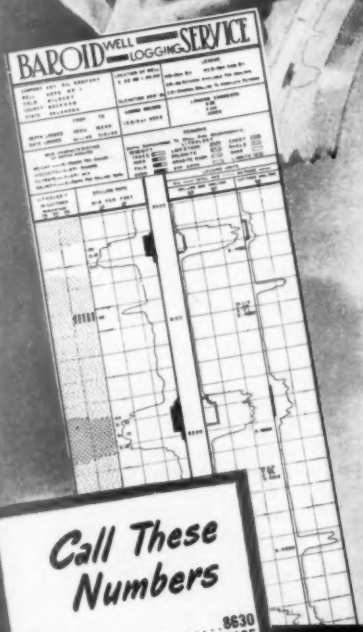

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EFFECTS OF PERFORATING are shown in these actual photographs on test sections of cement. Left: 100 per cent cement by absolute volume, cured 3 days at 100° F. Note heavy fractures. Right: A 50 per cent Pozmix-50 per cent cement section of Pozmix "A" (artificial pozzolan) under the same conditions.

New Development . . .

Pozzolans for Oil-Well Cements

by William P. Sterne
Mid-Continent District Editor

When mixed with portland cement, pozzolans cut down on heat of hydration, offer improved strength and resistance to sulfates.

POZZOLANS, the silicious materials used by ancient Romans in construction of highways and aqueducts, are now being used as an additive for oil-well cement.

Halliburton Oil Well Cementing Co. of Duncan, Okla., uses artificial and natural pozzolans with portland cement in manufacturing its new products, "Pozmix-Cement."

The mixture has been used sucessfully in more than 1,000 oil wells under all types of conditions and in practically all cementing procedures.

Among the important features claimed by Halliburton for the pozzolans-portland mixture are:

1. Low heat of hydration and volume change.
2. Improved tensile and compressive strength.
3. Greater resistance to sulfates.
4. Reduced leaching rate of soluble materials.
5. Less permeability than regular portland cements.
6. Considerable savings in both cement and costs.

Idea not new . . . Use of pozzolans with portland cement is not new, but Halliburton is believed to be the first to utilize the mixture for oil-well cementing. The company's engineering department first began investigating the possibilities for such use in October 1949.

Portland-type cement has been, by far, the most successful material for oil-well cementing. However, used "straight," this material has some undesirable properties to a certain extent. These may be: (1) A neat cement slurry, in cases, has a higher density than is desirable; (2) neat cement is susceptible to the corrosive action of sulfate waters, and will disintegrate in time in presence of some oil-field formation brines, (3) set neat cement is usually brittle and tends to shatter when perforated, and depth of penetration is much less than in low-strength cement, and (4) slurries made with only cement and water have fixed properties that cannot be altered to meet different requirements.

Howco engineers recognized the need for a cementing material in which (1) weight of the slurry could be controlled within certain limits; (2) one which would set to either high or low strength as desired; (3) one which would have ample fluid time to enable proper placement before setting, yet within a reasonable time after placement with sufficient strength to support the casing; and (4) one which would produce a set material having a high resistance to the corrosive action of oil-field brines.

A search along these lines lead to pozzolanic materials, since pozzolans normally produce a set cement that is sulfate resisting, gains strength slowly, is usually of lighter weight than portland cement, and in general possess desirable qualities for use in oil wells.

Field tests run . . . Field tests were made in Illinois, where an ample supply of artificial pozzolans was available. A total of 23 tests were carried

out successfully under all types of conditions, and completed in August 1950.

A blending plant was built in Illinois, and put into operation in May 1951. Enough blending plants to make the mixture available to all other areas are now being constructed by Halliburton at strategic locations. Facilities at El Paso, Tex., are now operating, utilizing natural pozzolans.

Types of Pozzolans

Both the artificial (fly ash, as an example) and the natural (silicious rocks of volcanic origin) pozzolans are being used by Halliburton.

Pozzolans themselves are not cementitious, but contain constituents which will combine with lime at ordinary temperatures in the presence of water to form stable, insoluble compounds possessing cementing properties.

Artificial pozzolans are mainly obtained by heat treatment of natural materials, such as clays and shales and certain silicious rocks. Certain combustion byproducts of natural material have also been found to be pozzolanic in character.

Natural pozzolans are of volcanic origin, and include certain diatomaceous earths. The supply is practically inexhaustable, since natural pozzolans occur over most of the western half of the United States.

What studies revealed . . . Studies by Howco engineers and chemists showed that certain pozzolanic materials would have a place in oil-well cementing. There was one exception: early strength was found to be relatively low. However, when portland cement and pozzolans are mixed together, the cement furnishes the lime necessary for the pozzolans to set, and also contributes to early strength desirable in most applications.

Pozzolan has a specific gravity of 2.3 to 2.8, depending on the source of supply. This compares with 3.1 to 3.2 for portland cements. The difference here results in a lighter-weight slurry for the pozzolan compared to a slurry of similar consistency with portland cement.

Since pozzolanic materials have a fineness comparable to portland cement, they require about the same water-cement ratio as portland. However, pozzolanic materials vary so in characteristic that each must be thoroughly tested before its suitability for any particular application can be established.

Lower Heat of Hydration

Howco reports that use of pozzolanic materials in portland cement slurries

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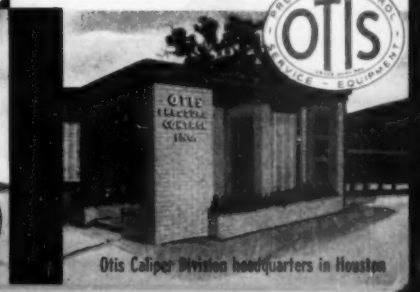
On-location Caliper chart

Otis reports include photostats of actual Caliper charts plotted during run

Calipering pumping wells for rod wear



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SAFE! Impulse does not trip until after dead center . . . so, *it can't kick back!*

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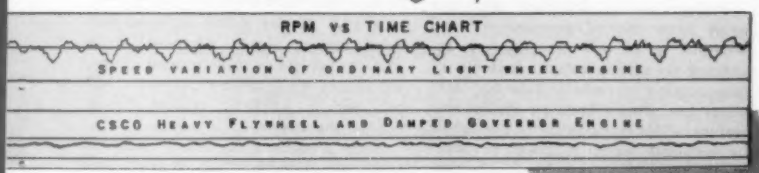
Since there's no need to stop, there's no need to restart!

Easy to Repair

CSCO parts needing repair or attention can be removed from the engine with a minimum of disturbance of adjacent parts or assemblies. For CSCO design embodies *unit assemblies*, permitting quick and easy accessibility. For example, the piston and rod assembly is easily removed through the crankcase without draining the water or oil. *No other essential parts are disturbed!*

CONTINENTAL

Smooth Steady Operation



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"Expansion of cement reduced to lower heat of hydration."

for oil-well cementing causes less heat of hydration to be produced because the portland cement content of the slurry is reduced by the pozzolanic material. The usual expansion of the set cement, which results in internal stresses is appreciably reduced by the lower heat of hydration.

Halliburton reports, that the thin layer of cement behind the casing is, in some cases, possibly cracked by the wide range of temperature changes the straight-cement slurry undergoes while hydrating. Use of portland-pozzolan cement relieves this situation. Both laboratory tests and field experience have shown that sufficient heat of hydration occurs to enable temperature surveys to define the top of a cement column behind casing. The proper time to run a temperature survey following a cementing job is not changed by the addition of pozzolan to portland cement.

Strength

Early strengths of portland-pozzolan cements are much less than regular portland cement, as has been brought out, but the material strengthens with age ultimately becoming as strong as neat portland cement. This property of the portland-pozzolan slurry is advantageous for use behind the casing because it is not as susceptible to fracture by gun perforating as those cements which would have high early strength. The mixture thus possesses a greater resilience than a similar neat cement of the same consistency, since less shattering of material occurs while perforating with projectiles.

Sulfate Resistance

Perhaps one of the most important gains from use of pozzolan-portland mixtures in oil-well cementing is resistance to sulfate attack. Inability of neat cement to resist sulfate and acid water has always been an undesirable feature. This is particularly noticeable in remedial work required in areas having formations carrying highly concentrated sulfates and brines.

Thickening Time

Portland - pozzolan cement slurry's total thickening time, when tested according to the A.P.I. code, as compared to a neat cement slurry of the same consistency, is approximately equal.

Pumpability of 50-50 portland-pozzolan cement slurries, after a time interval of remaining static, surpasses that of a neat cement slurry. This pumpability factor of the mixture is of great importance to the servicing of a well, for in case of equipment failure a longer shutdown period is available.

Lower Pressures

A characteristic of a Pozmix-cement slurry is the reduction of density with a minimum quantity of water. This results in an increased fill-up of cement between the casing and formation for a given hydrostatic pressure. This is of prime importance during the period of steel shortage, as the necessity of retrieving casing in abandoned wells, or the use of welded pipe becomes essential for continued exploration.

The ultimate gain of a light portland-pozzolana cement slurry is lower pump pressures than normally required for a given fill-up of cement. This in turn protects light weight or corroded casing against rupture due to excessive internal pressure in landing the top cementing plug.

Need for an efficient material for "plug to abandon" or "up-the-hole plugging" is becoming more pronounced. It is common to test a plug-back and find the column of cement has moved down the hole. The results from a poor mud, or the additional hydrostatic head imposed by the cement column being sufficient to allow migration of fluid into a permeable zone. Introduction of a portland-pozzolan cement slurry with a density approaching that of the mud with a great differential in slurry-mud viscosity should minimize plug movement under the most severe conditions.

A 13.5 lb. per gallon portland-pozzolan cement slurry, compared to a 15.5 lb. per gallon neat cement slurry, will reduce the hydrostatic pressure 520 psi. for a 5,000-ft. cement fill-up behind the casing.

Such pressure reduction is desirable when questionable zones of high permeability have been encountered, or zones where the bedding planes are such that moderate pressures will cause them to part and take large amounts of cement slurry.

TABLE 1—PERCENTAGE EXPANSION OF MORTARS IN SULFATE SOLUTIONS
(From "Chemistry of Cement and Concrete"—Lea and Desch.)

	—5% Magnesium sulfate—			—5% Sodium sulfate—		
Time (weeks)—	12	24	40	12	24	40
Portland cement	0.054	0.252	0.710	0.070	0.146	0.240
Burnt clay pozzolanic cement	0.004	0.002	0.004	No expansion.		
Trass pozzolanic cement	0.016	0.024	0.022	No expansion.		

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*RIG TIME	McCULLOUGH TOOL	JOB ACCOMPLISHED
54 MINUTES	Glass Jet Perforator	72 holes shot at 4000 feet (greatest depth)
ONE HOUR 10 MINUTES	Magna-Tector	Located stuck point at 4500 feet
ONE HOUR 15 MINUTES	Jet Bottom Hole Cutter	Fragmentized junk at 1200 feet—two runs
ONE HOUR 45 MINUTES	String Shot	Backed-off tool joint at 6500 feet
ONE HOUR 55 MINUTES	Jet Back-Off Tool	Backed-off tool joint at 7000 feet
TWO HOURS 20 MINUTES	Type "B" Bridging Plug and running Feeler	Set plug at 6400 feet
THREE HOURS 45 MINUTES	Glass Jet Perforator	126 holes shot at 3600 feet (greatest depth)
FOUR HOURS 15 MINUTES	Radiation Well Logger (Gamma Ray)	Logging from 5600 feet to surface
FIVE HOURS	Burrless Bullet Perforator	270 holes shot at 8200 feet (greatest depth)
FIVE HOURS 10 MINUTES	Jet Casing Cutter and running Feeler	Casing cut at 13,000 feet
FIVE HOURS 45 MINUTES	Neutron Log	Logging from 4600 feet to 1000 feet
SIX HOURS 15 MINUTES	Combination Glass Jet and Burrless Bullet Perforators	306 holes shot at 8000 feet (greatest depth)
38 HOURS	Glass Jet Perforators	3700 holes shot at 10,000 feet (greatest depth)
73 HOURS	Burrless Bullet Perforators	7752 holes shot at 5000 feet (greatest depth)

*Includes setting-up at rig and tearing down equipment.

ACTUAL RIG TIME DEPENDS UPON WELL CONDITIONS.
The above jobs are not the fastest, nor are they average time. Well conditions vary to such an extent that the average rig time for any specific job or tool can not be determined accurately. Yet, many of these jobs were accomplished under severe conditions, and completed successfully in a few minutes or hours.

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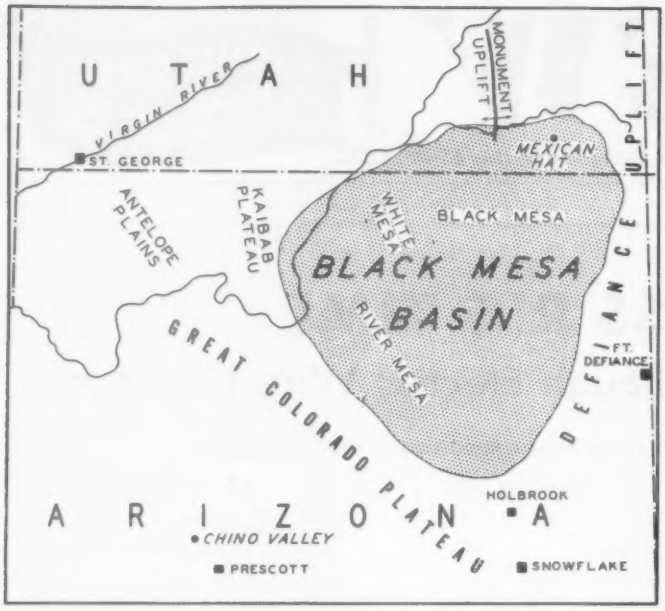

OIL PROSPECTING to date has largely been around borders of Black Mesa downwarp.

What are the prospects for

Oil and Gas in Northern Arizona?

"... on the basis of geologic history ... northern Arizona includes a sufficient accumulation of marine sedimentary rocks, locally showing favorable structures, to justify further exploration."

by Edwin D. McKee

IN considering northern Arizona from the standpoint of a potential producer of petroleum, it is significant that in at least some parts of the region sedimentary rocks are of sufficient thickness to be suitable as a host. It is equally clear that gentle warps and other structural features of the type required for oil accumulation are present in many places. The principal factor still to be determined, therefore, is the presence of suitable source rocks.

Of the geological periods represented in strata of northern Arizona, three have thus far given some suggestion of being potential sources. In order from youngest to oldest, these are: (1) the Triassic, (2) the Pennsylvanian, and (3) the Devonian.

Triassic strata (Timpoweap) have already produced small quantities of the high-grade oil in the Virgin River area of southwestern Utah. Because the strata concerned do not extend beyond the northwestern part of Arizona, possibilities of production from them are limited to that area. All other Triassic rocks, as well as Jurassic, within the state are continental and therefore have no significance as source rocks.

Pennsylvanian age strata, locally included in the bottom part of the Supai formation, have furnished suggestion of being oil sources in several areas. At Mexican Hat, Utah, near the northeastern part of Arizona many small showings of oil have been obtained in these rocks. Farther south near Snowflake, Ariz., traces of gas were encountered in drilling and similar traces, together with the presence of black shales and fetid limestones have given encouragement to further prospecting in these deposits.

Devonian age rocks offer the third possible source rock for petroleum in northern Arizona. Here the Devonian locally is a dark limestone that produces a fetid odor and gives other suggestions of containing the necessary hydrocarbons. Such traces have been noted in the Chino Valley area but the rock there is thin and near the surface; northwestward it thickens considerably.

Prospecting Inconclusive

Oil prospecting in northern Arizona to date has been largely around the borders of the Black Mesa downwarp of the Navajo Indian Reservation. Success in this area hinges in large measure on whether or not the area was a true basin of deposition in Paleozoic (especially Pennsylvanian) time, or whether it was a less depressed region between the two established basins of Pennsylvanian age—to the north and to the south. This question is at present entirely unsolved and can be answered only by drilling. The dozen or so wells that have been put down, largely on the borders of this area, fail to reveal any conclusive data.

The northwestern part of the plateau is a second area that justifies further exploration. From the standpoint of thickness of strata and amount of marine deposits, it is favorable. Structures in this area are mostly high-angle faults with few folds or flexures, however, so opportunities for accumulation may not be suitable. Some prospecting by large companies has been started in this area during the past year.

Geology

The geology of northern Arizona is that of a plateau in which sedimentary rocks in essentially flat-lying position

THE AUTHOR

Edwin D. McKee is head of the geology department at University of Arizona. He received his A.B. degree from Cornell University in 1929 and later did graduate work at California and Yale universities. He has done research work with Carnegie Institute, Office of Naval Research grant, and the Atomic Energy Commission. He has had 46 geological papers on sedimentation and stratigraphy published, and is presently president of the Arizona Geological Society.

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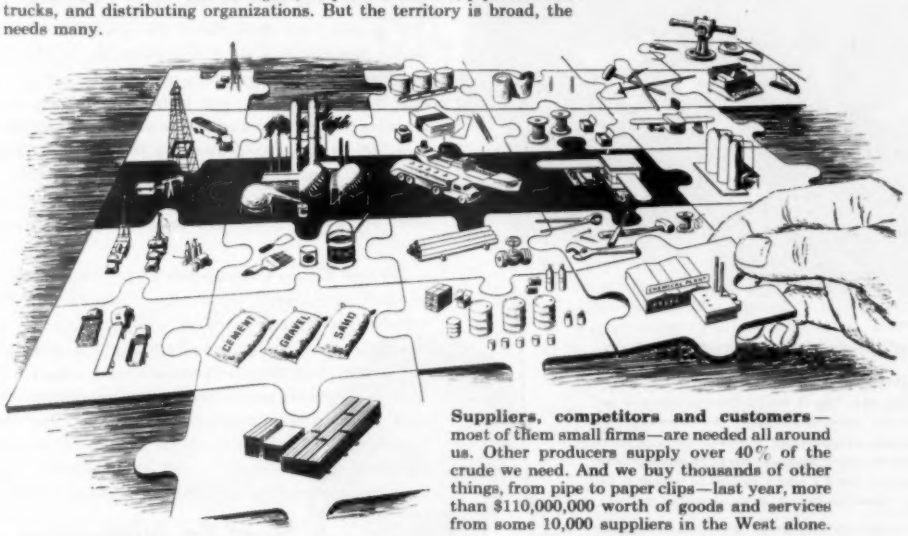

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"Northern Arizona justifies further oil exploration."

form a major part of the region. These strata vary in thickness from place to place across the state; they are displaced locally by high-angle, normal faults and elsewhere by gentle warps and monoclines; they are covered in places by lava flows and other volcanic materials. By and large, these strata are characterized chiefly by uniformity of character and by relatively undisturbed position.

The amount and variation in thickness, as well as the composition of various sedimentary formations within the region, are functions of (1) the basins or areas of accumulation in which they formed, and (2) the original elevation and character of surrounding lands that served as sources for sediment. This structural framework upon which various types of rock, both marine and continental, were developed must be understood in order that geologic controls of the region be properly evaluated. For this reason, many recent studies have been directed toward the gathering of data bearing on this subject.

The sedimentary rocks of northern Arizona as illustrated in the walls of Grand Canyon and elsewhere in the region represent in sequence a considerable portion of the major subdivisions of geologic time. The history of each of these formations is a problem in itself. However, certain generalizations can be made on the basis of present knowledge regarding regional variation and the trends in change through time. The following broad statements seem justified:

1. Throughout most of early geologic time (Cambrian-Jurassic) a rapidly sinking trough or geosyncline in which sediments accumulated to a thickness of many thousands of feet lay to the northwest of northern Arizona—in Nevada and southwestern Utah.

2. During the same time an area along the eastern border of Arizona near the present site of Fort Defiance and near the Zuni Mountains tended to remain above sea level and higher than the surrounding region, to form what is designated as a "positive area."

3. Between the fast-sinking geosyncline to the west and the positive area to the east, across all of northern Arizona lay a shelf that sank slowly and irregularly and was intermittently covered by shallow seas extending outward from the trough to the west. The nature of this shelf is a subject with which we are primarily concerned in the geologic history of northern Arizona.

A series of isopach maps, made by locating contours with respect to rock thicknesses, has been determined through outcrop and well-sample data and shows the trends in deposition for each geologic period. Strata of Cambrian, Devonian, and Mississippian age, entirely marine, are found to thicken northward and westward across the state. In contrast, those of Pennsylvanian and Permian age, which are considerably thicker and include many continental deposits, also have been influenced by fast-sinking basins along the southern margins of the present plateau. Finally, the Triassic and Jurassic sediments almost entirely continental in Arizona, and the largely marine Cretaceous on top, show major increase in thickness northward.

Conclusions

In summary, it is concluded on the basis of geologic history that northern Arizona includes a sufficient accumulation of marine sedimentary rocks, locally showing favorable structures, to justify further exploration for petroleum. Likely areas not yet fully examined, for which there is a need of more geologic data obtainable through drilling, are the Black Mesa and the western part of the plateau.

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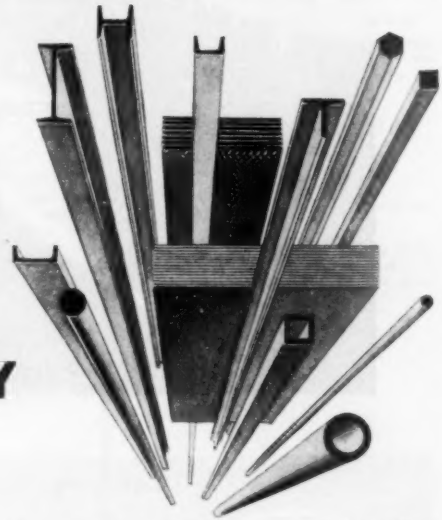

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Arrangement of G-R G-Fin Storage Tank Oil Heater for installation outside of the tank.

Design of G-R G-fin Storage Tank Oil Heater for installation outside of the tank, showing heater shell and withdrawn tube bundle attached to head.

Arrangement of G-R G-Fin Storage Tank Oil Heater for installation partly within the tank.

Design of G-R G-Fin Storage Tank Oil Heater for installation partly within the tank, showing the shell with shell cover removed and tube bundle withdrawn.

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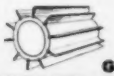

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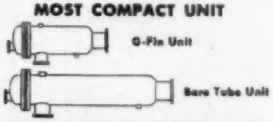
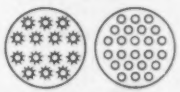


The increased heat transfer surface of the G-Fins means more heating surface in a given volume, and thus least heater space for a required duty.

FEWER TUBE JOINTS

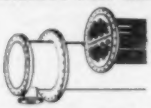


The small number of G-Fin heating elements results in a minimum of tube joints.

LEAKPROOF JOINTS

The conical ends of the G-Fin elements are seated in the tube sheet with accurately machined metal-to-metal joints held tight by lock-nuts.

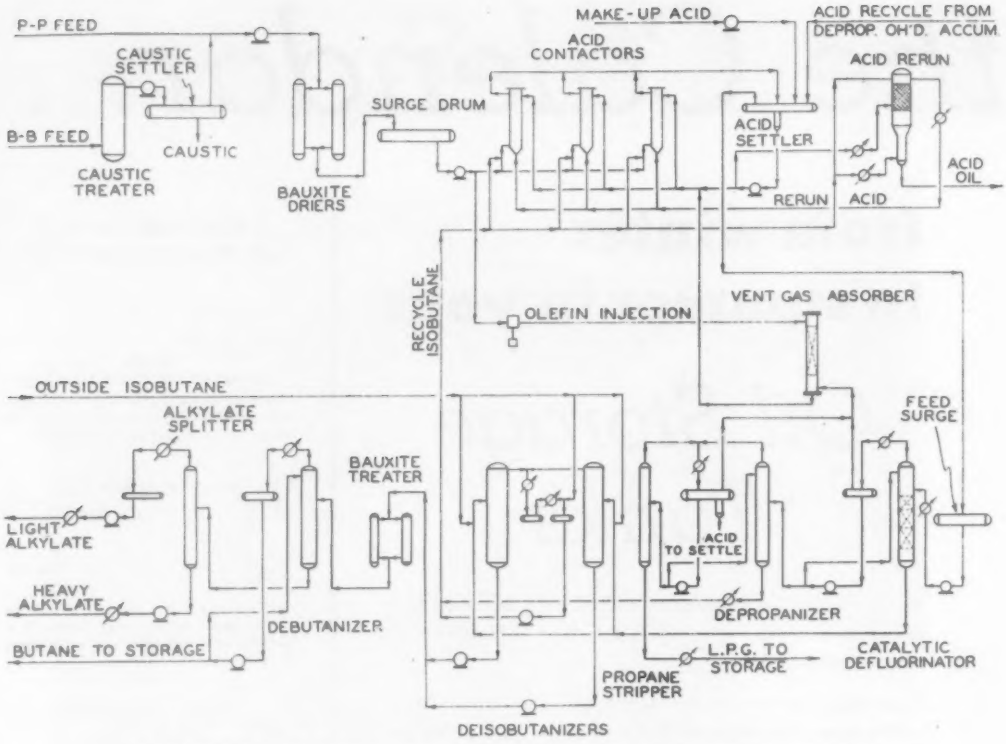
ACCESSIBILITY FOR CLEANING



By removing lock-nuts at the tube sheet, individual G-Fin elements can be removed from the heater for inspection, thorough cleaning or replacement.

Oil Heater

One of the many types of G-R Heat Transfer Apparatus



FLOW SHEET for HF alkylation unit in operation at Sweeny, Tex., refinery of Phillips Petroleum Co.

Revamping an HF Alkylation Unit

Here's how Phillips Petroleum reactivated an idle wartime unit at its Sweeny, Tex., plant, and in doing so brought it completely up to date

by F. Lawrence Resen
Gulf Coast District Editor

REACTIVATION of an idle wartime hydrofluoric acid alkylation unit at the Phillips Petroleum Co., Swenny, Tex., refinery presented the design engineers with an opportunity to incorporate the latest improvements in HF alkylation unit design. Major revisions include catalytic defluorination, vent-gas absorption, propylene alkylation, propane stripping plus modifications to acid contactors and bauxite driers.

The Sweeny HF alkylation unit was part of the aviation-gasoline plant operated by J. S. Abercrombie Co.-Harrison Oil Co. for the Government during World War II. Following the war, Alamo Refining Co., a subsidiary of Phillips Petroleum Co., purchased the plant. The HF alkylation unit which was reconditioned in the fall of 1951 was originally designed for the production of 4,800 bbl. per day of aviation alkylate. At present, feed stock availability limits the production of the reactivated unit to about 3,500 bbl. per day. However, in event of an emergency and with outside feed stocks available, expenditure could be economically made to increase production upward of 8,000 bbl. per day of aviation alkylate.

Phillips Petroleum and other companies which utilize the HF alkylation process for the production of high-octane motor fuel and aviation gasoline components, have continually improved the process until it is now in many refiners' opinions the most economic process in the highly competitive field of producing high-octane blending stocks.

Process Flow

The process flow on the original installation was common to HF alkylation units constructed during World War II and consisted primarily of feed drying, contacting, stripping, treating, and fractionation. The major revision on the reconditioned unit was conversion of the HF stripping tower to a catalytic defluorinator and moving the bauxite treaters from upstream to downstream of the deisobutanizers. The catalytic defluorinator is operated to take practically all of the propane overhead. A vent-gas absorber was added

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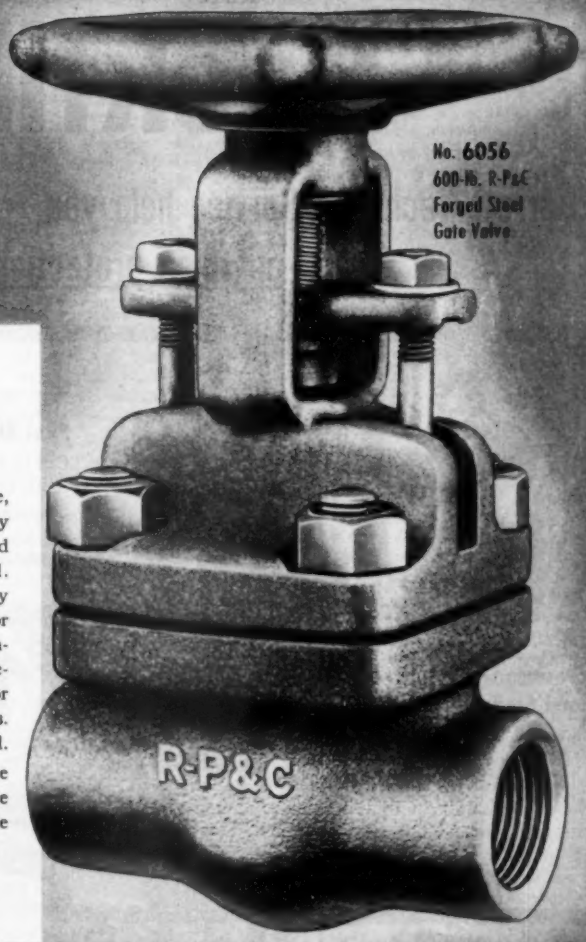

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"Revamping considerations: safety, economy, reduced maintenance."

to recover HF acid which would normally be lost with the light vent gases. A propane stripper was added to remove traces of HF from propane L.P.G.

A simplified diagram of the revised flow is shown in Fig. 1 Butane-butylene feed stock is caustic washed after leaving gas-concentration unit and sent to storage. Butane-butylene and propane - propylene stock is passed through two large bauxite driers formerly used for defluorinating bottoms from the HF stripper. The dried stock passes through a charge surge drum, is mixed with recycle isobutane, and injected into the bottom of the contactors. Acid from the rerun column is also injected into the bottom of the contactors. Three of the original six contactors have been modified and are in use. The other three are in position and may be placed on stream should future expansion warrant such a move.

A single acid settler receives overhead from the contactors and fresh acid is injected at this point. Acid from the bottom of the settler passes back to the contactors. The overhead hydrocarbon phase is charged to the catalytic defluorinator.

Overhead from the defluorinator is charged to the depropanizer, now run in conjunction with the propane stripper. Bottoms from the depropanizer are fed into the recycle isobutane stream. The overhead goes into an accumulator and then into the propane stripper. Acid recovered in the accumulator is fed back as recycle. Bottoms from propane stripper are sent to L.P.G. storage while overhead is recycled through the accumulator. A purge line from the accumulator connects to the vent-gas absorber.

Bottoms from the defluorinator are fed to two parallel deisobutanizers, whose overhead is sent into the recycle isobutane stream.

Deisobutanizer bottoms pass through two bauxite treaters into the debutanizer. Bottoms from the debutanizer are charged to the alkylate tower where light and heavy alkylate are split for storage.

Details of Modification

In revamping the unit, primary considerations were safety, reduced maintenance, and economy in process materials.

Catalytic defluorinator . . . The hydrocarbon phase from the acid settler is charge stock for the catalytic defuorinator. The charge contains hydrocarbons, some acid, and fluorides resulting from primary and secondary reactions in the contactors. Formerly, the acid was stripped in the HF stripper and the hydrocarbons sent on to the deisobutanizers.

The purpose of the defluorinator is to convert the fluorides to HF and olefin and to separate the acid content of the overhead mixture for the acid recycle system. Hydrocarbons carried overhead are charged to the depropanizer.

The HF stripper tower was converted by removal of bubble trays in its lower section and the installation of four beds of Raschig rings. The upper bed is 8 ft. deep and contains 1-in. and 1½-in. carbon rings while the lower three beds (8, 7 and 6-ft. deep) contain 1-in. aluminum rings.

Reflux has now been provided at a ratio of 0.4 to 1 based on feed to the defluorinator. Previously no reflux had been used. A change was also made on the feed entry point to the tower. The charge now enters between sixth and seventh trays (numbered from the top). Previously it was injected on the topmost tray.

Acid contactors . . . Three of the original six Stratco-50 contactors have been reactivated, with the others in position to be utilized if future expansion so demands. Hydrocarbons are mixed with acid in the contactor. Two major streams enter the units. Fresh olefin charge and isobutane are mixed just prior to entering the base of the contactors, while acid recycle is added at the top. A third stream of rerun acid is now being injected at the base of the contactors.

In the original installation, a 500-r.p.m. impeller had been installed in the bottom of each contactor for agitating the acid and feed. These were operated by 250-hp. steam turbines having a special reduction and director device. An isobutane flush and oil seal were required with this arrangement and the design was such that a great deal of maintenance was found necessary.

The impellers have been removed and mixing is accomplished through internal baffling and turbulence. Performance has been satisfactory under the modified setup with resultant savings in horsepower, maintenance costs, and improved housekeeping. One of two acid settlers has also been retired along with the three other contactors.

A second change on the contactors was the replacement of the scabbard-and-blade cooling bundles in the units with conventional four-pass U-tube bundles. Sediment had reduced the efficiency of the bundles and no simple method had been found for cleaning the scabbards. The change to the U-tube has improved the heat-transfer rate and also resulted in maintenance-cost savings.

Acid service . . . To give positive and longer service under acid conditions, a change was made from plug valves to gate valves. In all acid and trace-of-acid services, the valves were monel trimmed, providing monel valve seats and monel-clad wedges. In all piping in acid and trace-of-acid usage monel studs were used on flanges along with ring-joint gaskets.

The most corrosive service experienced was in the acid rerun tower condensers. Single passes are made through two condensers in series, and the first-pass condenser was designed with a monel-clad shell and containing a monel tube bundle. The second was constructed of conventional carbon steel. The change has eliminated frequent down time due to corroded tubes.

Scrubbers, driers and treaters . . . The propane - propylene feed is caustic washed at the gas-concentration unit. Caustic is maintained in a tower packed with Raschig rings; fresh caustic is added as needed.

The olefin feed drier system formerly consisted of three bauxite units; these have been retired from service. Two large driers formerly used to defluorinate the HF stripper bottoms on their way to the deisobutanizers, are now used to dry the propane-propylene and butane-butylene streams. The streams are mixed just prior to entering the parallel driers. Outside isobutane is dried through three bauxite units as installed originally. Hot butane is used to regenerate the units on a semiweekly schedule.

Under the above conditions it has been found practical to leave the original bauxite charge in place for several months on the deisobutanizer bottoms bauxite treaters. It is anticipated that it will not be necessary to replace the bauxite more often than every 6 months. This represents a substantial savings in bauxite when compared to the original operating routine of a 3-4-week renewal schedule for the bauxite.

Other modifications . . . A propane stripper has been added to permit production of L.P.G. specification propane. Feed for the stripper is obtained from an accumulator shared with the depropanizer. These two units also employ a common condenser. Propane stripper pressure is controlled by a differential pressure controller to hold 20 psi. differential between the stripper and the accumulator, with the stripper

"Revamped unit produces 3,150 bbl. per day of alkylate."

bottoms going to L.P.G. storage. Overhead from the stripper recycles through the accumulator from which noncondensable gases are vented to an absorber.

The stripper bottoms are also used as flushing propane for the propane reflux pump and the propane stripper feed pump, thereby further serving to keep the propane on specification. Some acid-service pumps are provided with an isobutane flush from the depropanizer bottoms. Deisobutanizer overhead may also be used for this purpose.

The vent gas absorber is an 8-in. by 15-ft. pipe packed with ½-in. Raschig rings. It is refluxed with 1 to 10 bbl. of B-B feed. HF vapor from the gases is absorbed by this stream which returns the acid to the contactors. The HF free gases are then flashed to atmosphere.

Direct-fired reboilers on the debutanizer and alkylate towers were replaced by 450-lb. steam reboilers in order to lower metal skin temperatures. A safety factor involved in this change is the elimination of flames from the vicinity of the light hydrocarbon area of the unit and nearby storage tanks.

Five gagetron level-control instruments having an outside radium source have been installed in the system so that no part of the instrument is in contact with the acid. The gagetrons are used as (1) level indicator on defluorinator feed surge drum; (2) level indicator on defluorinator tower accumulator; (3) liquid-level controller on depropanizer accumulator; (4) liquid-level controller on oil leg of acid rerun tower; (5) level indicator on acid storage tank.

Operating data . . . Performance of the unit has been based on a present production of 3,150 bbl. per day.

Makeup acid now runs near 0.3 lb. acid per barrel alkylate with a lower consumption anticipated.

Olefin feed, 1,000 bbl. per day mixed butylenes, 850 bbl. per day propylene.

Isobutane consumed, 2,300 bbl. per day, 1.25 bbl. per bbl. olefin.

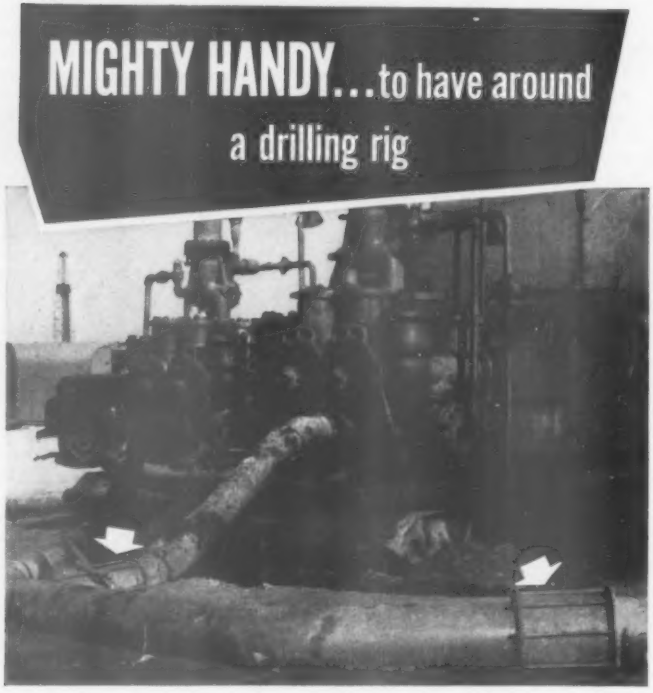
Total alkylate yield, 3,150 bbl. per day.

Isobutane/olefin ratio, 7/1.

Yield factor, 1.7 bbl. B.F. alkylate per bbl. olefin.

Per cent B.F. light alkylate, 90.

Octane numbers: Av. lean octane No. with 4.6 cc. TEL F-3, 107-108 AGAC Aviation Oct. No. Av. supercharge 4.6 cc. TEL F-4, 142-146 Index No.



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BOOKS

TECHNICAL COOPERATION WITH UNDERDEVELOPED COUNTRIES. By Philip C. Newman, John E. Ullmann, and Robert S. Aires. Published by Chemonomics, Inc., 400 Madison Avenue, New York 17. 96 pp. $5.

This small volume purports to review and analyze what can be done in undeveloped areas in terms of concrete industrial planning. The subject is discussed from both a theoretical and practical aspect. After defining the problem of technical assistance and the conditions and limiting factors in industrial growth, the book reviews methods of industrialization which have been used in the past, details and discusses the basis of Point 4 industrialization and its potentials, and emphasizes the activities of local governments, national and international organizations. Four Latin-American countries and the Colombo plan are examined as case histories in such development. Action by private investors, naturally, receives extensive treatment.

WIRE-ROPE LUBRICATION. By E. V. Paterson. Published by Scientific Publications, Wellington, Shropshire, England. 46 pp. 3s, post free.

This pamphlet-size booklet was prepared at the request of several wire-rope manufacturers who, more than most people, realize the importance of the subject. It covers the subject of proper lubrication to preserve wire rope and increase the length of its useful life.

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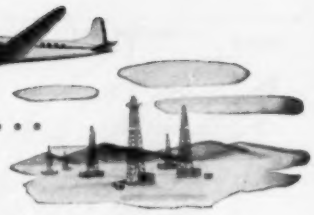

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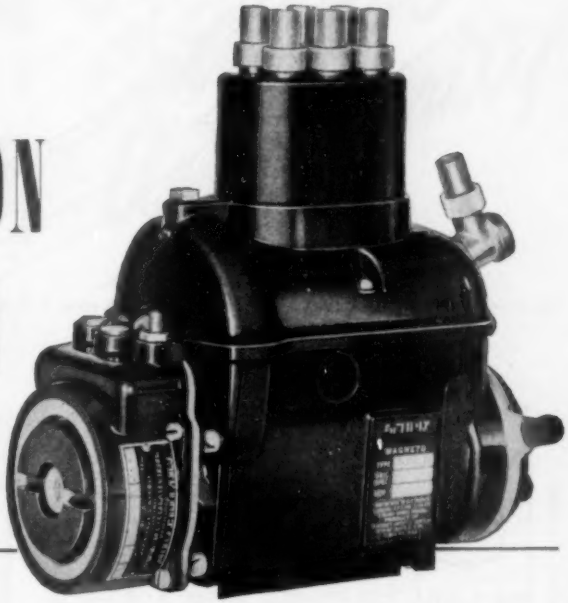

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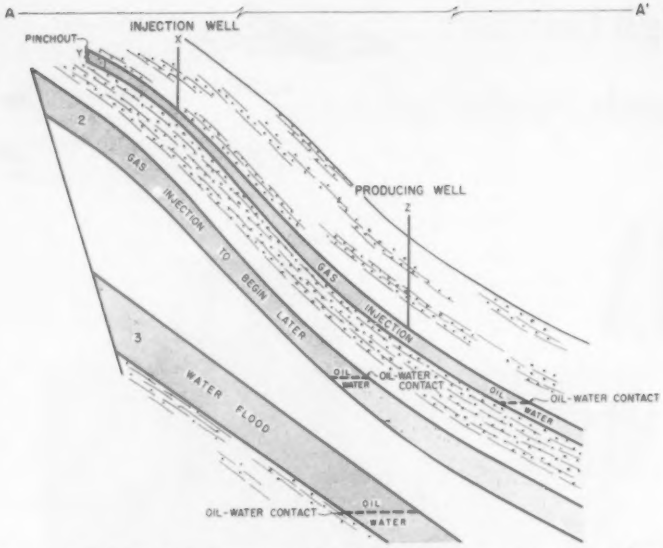

Fig. 13—Cross-section of the Oligocene pay sands (Unit D) which occur on flank of salt dome.

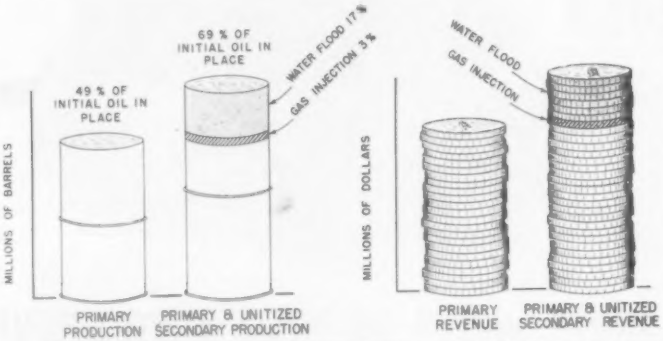

Fig. 14—Production and revenue, primary recovery versus Unit D programs.

Why It Pays to Unitize

(Continued from page 65)

injection well marked X is positioned high on the structure but not at the very crest. The engineering performance prediction is as follows:

Injected gas will rise by gravity segregation to the updip limits of the reservoir marked Y. In so doing, a half million barrels of oil will be displaced downward to be produced from downdip producing wells marked Z. This oil would be otherwise unrecoverable because it is now confined in the irregular wedge points along the pinchout Y. The pressure thus exerted by the injected gas, together with a controlled rate of withdrawal from wells Z, will allow the natural water drive (marked Oil-Water Contact), to encroach updip at a predetermined rate. At the end a maximum recovery of oil will have been effected from all the porosity lower than the highest structural well X, and the porosity above this elevation will be filled with gas only.

This production and fuel-conservation procedure is calculated to save $788,000 in initial investment expenses and to produce a half million more barrels of oil than would be possible with any other type secondary-recovery program. Somewhat similar depletion programs will doubtless be put into operation in the other two sands.

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6. "Engineering and Economic Aspects of Unit Operation," Oil Weekly, (Nov. 21 and Nov. 28, 1930), T. E. Swigart.

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8. "Petroleum Conservation," sponsored by Henry L. Doherty Memorial Fund, published by A.I.M.E. (1951), edited by Stuart E. Buckley, p. 275.

BOOKS

A PRACTICAL GUIDE TO LP-GAS UTILIZATION. By Earle A. Clifford. Published by Moore Publishing Co., 48 West Thirty-Eighth Street, New York 18. 384 pp. $4.50.

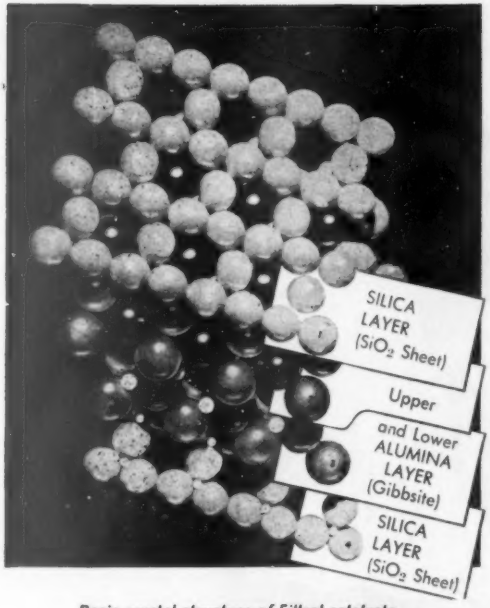
The purpose of this book is to present the fundamentals of liquefied petroleum gas utilization in practical and simple terms in such a manner as to be of benefit to the men engaged in the installation and servicing of L.P.G. equipment and appliances and in the transportation and delivery of the fuel. Wherever possible, mathematical problems have been resolved into tables and charts from which the essential information can be obtained. In many cases the formulas have been included for the benefit of those who may be interested in the technical background of the various short cuts. The book is divided into 29 chapters and is copiously illustrated.

REPORT OF INVESTIGATIONS NO. 13, PETROLEUM AND NATURAL-GAS SERIES NO. 3, PART I, OIL AND GAS WELL DRILLING STATISTICS FOR 1951, PART II, "ORISKANY SAND STUDY" AND "THE CANTON GAS POOL." Published by the State of Ohio Department of Natural Resources, Columbus.

Two outstanding articles occur in Report No. 13. They are: "Oriskany Sand Study," which reviews the result of Oriskany sand drilling in eastern Ohio up to and including the new Putnam field discovery in Washington County, and "The Canton Gas Pool," which reviews the discovery, development, and economic aspects of a typical Clinton sand gas pool in Ohio. The latter is the most accurate and thorough review of a Clinton gas pool to appear in print.

GRAYSON COUNTY OILMANAC. By Frank J. Gardner. Published by Five Star Oil Report, Petroleum News Corp. Box 331, Houston. 93 pp.

This book is the second in a series of county references by the author. They are devoted to a detailed study of the oil and gas resources of the individual counties of Texas, New Mexico, and Louisiana. The book fills the oil industry's need for concise, concentrated study of single, small areas of coverage. This concise study of Grayson County, Texas, deals with the history, general geology, and individual field development of the county. The book contains 20 illustrations, 3 charts, and a county ownership map, showing location of all fields and principal geological features of Grayson County.



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Air Drilling

(Continued from page 61)

A weight of 6,000 to 8,000 lb. was kept on the bit, or about half that normally used in drilling this size hole with rotary mud. When the 6⅝-in. drill pipe was used about 180 ft. of 7¾-in. drill collars was incorporated in the string. With the washover pipe, 40 ft. of 9-in. collars was used.

Holes were drilled on three different islands, nine being drilled with 12¼-in. bits and three with 15-in. bits. An average of about 3 days per well was required, with the hole being drilled in 16 to 18 hours and about 36 to 72 hours elapsing from spudding to the time the casing was cemented.

Penetration rates varied widely, but on the average hole-making was estimated to be twice as fast as would be done using rotary mud. At times drilling rates as high as 350 ft. per hour were obtained; on the other hand only about 5 ft. per hour could be made at times when drilling through igneous rock. Bits generally drilled about 700 ft. of hole before being discarded. Average consumption was about 1½ bits per hole.

Cuttings deposited at the surface varied from powder to thumbnail size. During times of fast drilling they accumulated with such rapidity that a skip-loader used to transfer them some 20 ft. farther from the derrick was unable to keep up. There was no noticeable abrasion of pipe or fittings.

Drilling difficulties . . . Shell planned to drill all the holes to about 1,000 ft., at which depth it was believed there would be no serious lost-circulation troubles. Only two were able to reach this depth. The remainder could be drilled only to around 740 to 840 ft., at which depths water became such a problem the cuttings could not be blown from the hole.

Because of this water problem, air drilling was stopped when this formation was drilled into and 9⅝-in. casing set at that point. Of the few wells which have since been drilled with mud below the casing point, none have encountered serious mud losses.

In several wells thin sections of damp formations were encountered nearer the surface. To overcome this problem two reamer lugs were welded on opposite sides of the bit. Thus when the bit became balled up, pipe rotation was continued while the string was lifted the length of the kelly. In some cases it took 3 or 4 hours for the bit to drill out of the wet cuttings which had accumulated above it. After drilling the length of the kelly, the bit then was pulled, cleaned, and rerun.

Hole sloughing also became such a problem in a 15-in. hole at one island that the well had to be abandoned after spending 4 days attempting to complete it. The walls began caving after a depth of 275 ft. had been reached. They continued to do so until the hole became so large the upward air velocity was insufficient to remove the cuttings from the hole. Calipering revealed the hole varied in size from 16 to 32 in.

Shell also found that in addition to normal hole making, air could be used in washing-over, fishing, and drilling-around operations. The experience was had at a hole which a spudder had drilled to 210 ft. and was unable to go deeper. When the rotary rig was moved over the hole it soon developed there were sizable quantities of junk in the hole. Fishing and washing-over attempts did not remove all the junk, but using air circulation a hole was drilled around and down to 1,058 ft.

Another interesting experience was in using a 15-in. bit to ream a 725-ft. hole from 12¼ to 15 in. in diameter. While amounting to a redrilling job, air circulation proved satisfactory in removing the cuttings as they were reamed from the walls and did not allow them to fall to the bottom of the hole in appreciable amounts.

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. . . says Leo J. Haverkamp, owner of Leo J. Haverkamp Well Servicing, Muenster, Texas, who owns 3 Wichtex Rod, Tubing and Bailing Machines.

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Leo J. Haverkamp owns one Wichtex Model C-65 (recommended to 6000 ft.), one Model C-60 (recommended to 3500 ft.), and the Model TE-2 pictured here (recommended to 2000 ft.). Wichtex manufactures a complete line of Rod, Tubing and Bailing Machines, Drilling In and Cleanout Machines, and Portable Rotary Rigs. For information, write WICHTEX MACHINERY CO., P. O. Box 2250, Wichita Falls, Texas.

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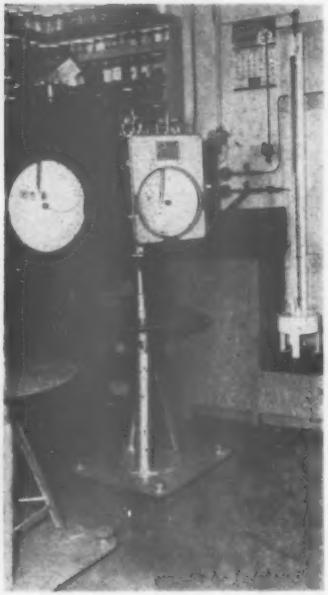
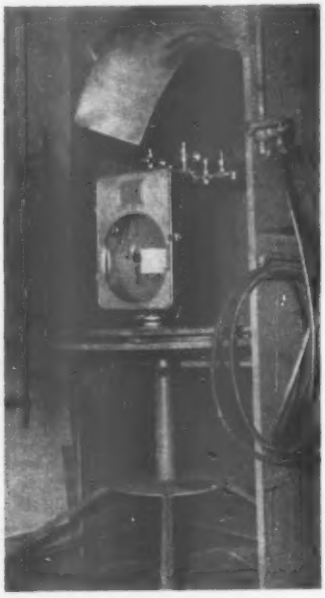


1 Moving stands like the one above were devised to facilitate work. Note work table on which tools and parts may be placed.



2 Wheeled stand is used for moving meter in and out of painting booth. Turntable permits all sides of case to be painted.

Meter Repair

Sunray completely repairs, overhauls orifice meters and other instruments at gas laboratory in Newhall-Potrero

AT its central gas laboratory in Newhall-Potrero field near Los Angeles, Sunray Oil Corp. is equipped to completely repair and overhaul orifice meters, gages, and other instruments used in measuring and controlling the company's gas production throughout California fields.

The meter-repair department is operated in conjunction with a gas-measurement and testing laboratory where all tests on field gas are run, and routine control testing is done for guiding operations of the natural-gasoline plant serving Newhall - Potrero. Through monthly rotation of duties the staff has been well versed in testing and in maintenance and repair of instruments.

Spares used . . . Where possible repair work is performed in the field. When this is not possible a spare instrument is substituted and the faulty one brought to the shop. Gage-board instruments in the natural-gasoline plant, such as electronic recorders and pneumatic controllers, likewise are repaired in the shop.

When an orifice meter, for example, is brought in for repair it is disassembled and all worn or faulty parts replaced by new ones from stock. Spare parts or assemblies are kept for all types and makes of instruments used. To facilitate repair work the movable stands shown in Fig. 1 were devised, complete with a work table on which tools and parts may be placed.

Repainting . . . While the meter is disassembled the case is stripped of its old coating and spray painted to look like new. Repainting is carried out in a small booth in one corner of the shop. As shown in Fig. 2, use is made of a wheeled stand for moving the meter in and out of the booth. The turntable on which the meter is mounted permits all sides of the case to be made easily accessible for painting.

Mercury and water manometers (Fig. 1) are available for checking the accuracy of instruments within the range of 27 in. (Hg) vacuum to 26 psi. pressure. Vacuum is provided by an aspirator or suction pump. For calibrating pressure gages a dead-weight tester is available.

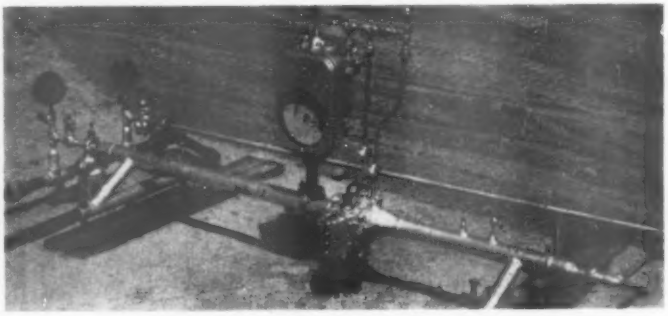
A card index is kept on all instruments used in the California gas department.

Portable Meter Run

So that orifice meters can more easily be moved and set at gas injection and other wells where it is not desired to provide a permanent meter run, the portable hookup shown below is being used by Sunray Oil Corp. in Newhall-Potrero and other California fields.

Four hooks welded to the legs of the run permit a sling to be attached and the entire assembly picked up by a crane-equipped truck for movement to the field. Spotted in the desired position at the well site only two quick makeup connections have to be made to incorporate the metering equipment in the gas line.

Orifice taps and other facilities for metering gas are incorporated in the horizontal member. To facilitate gas testing a sampling cock and thermometer well are placed downstream from the orifice connection.



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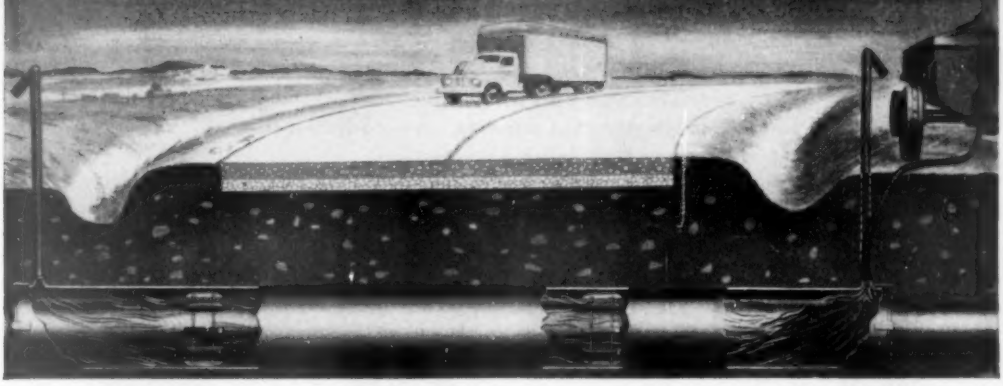

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1 Air foam is being used by these Esso firemen in demonstrating the proper technique in combating a fire in a low tank of oil. Company firemen recently demonstrated their skill before 120 municipal, industrial, and armed forces firemen.

Esso Fire Fighters

They put on a big show for visiting firemen at Baton Rouge, La., refinery; exchange of ideas should benefit all

THE possibility of a hazardous fire is ever present in refineries where the presence of highly volatile materials provide both the fuel for a fire and a difficult fire-fighting problem.

However, nothing is left to chance at Esso Standard Oil Co.'s Baton Rouge, La., refinery, where a highly trained fire-fighting group is maintained to cope with any blazes at the plant.

The firemen have received special instructions on how to control and extinguish various types of fires, including fires in tanks, separators, leaking flanges, and leaking pumps.

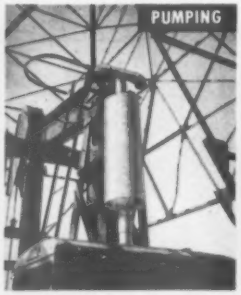
Demonstration held . . . The fire-fighting drill group recently held a demonstration for 120 municipal, industrial, and armed service firemen from the State of Louisiana.

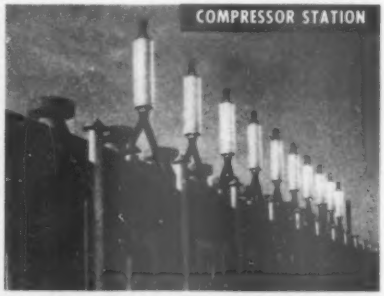
The sharing of their "trade secrets" provided a service to both the attendees and the petroleum industry as a whole, since many conflagrations require the fire-fighting resources of all nearby communities before they are successfully controlled.

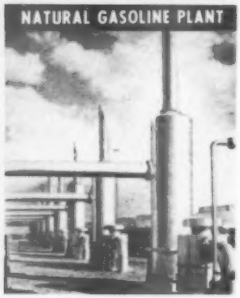
2 A leaking flange caused this blaze, which the Esso drill group is extinguishing by means of a dry-powder extinguisher.

3 R. L. Gilpen, Esso fireman, demonstrates the method of control and fighting a fire in a leaking pump.

FROM THE WELLHEAD THROUGH THE REFINERY GATE IT'S BURGESS-MANNING







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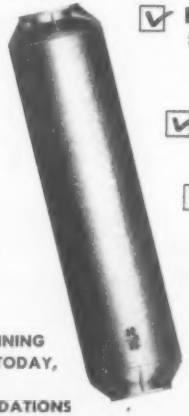

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No. 13

PUMPS

Part 13—Centrifugal Pump Operation

by Gerald L. Farrar
Engineering Editor

THE last two previous installments have been devoted to the operation of reciprocating and rotary pumps; centrifugal pump operation is discussed here.*

Priming . . . Before starting the pump, the casing and suction line must be filled with fluid. The pump must not be run unless it is completely filled with fluid, as there is danger of injuring some of the parts of the pump which depend upon fluid for their lubricating. Wearing rings will not seize when the pump is filled with fluid but are very liable to do so when the pump is run dry. The pump may be primed by any of the following methods, as may be best suited to the conditions:

When steam, high-pressure water, or compressed air is available, the pump may be primed by attaching an air ejector to the highest points in the pump casing. This will remove the air from the pump and suction line provided a tight valve is installed in the discharge line close to the pump.

As soon as the ejector waste pipe throws fluid continuously, the pump may be started. After starting, a steady stream of fluid from the waste pipe indicates that the pump is primed. If this stream of water is not obtained, the pump must be stopped at once and the process of priming repeated. A foot valve is unnecessary when this kind of device is used.

When it is not practicable to prime by ejector or exhauster, the pump may be primed by the use of a foot valve. The foot valve will prevent fluid running out through the suction inlet and the pump can be completely filled with fluid from some outside source.

Pet cocks on top of the pump should be opened during filling to allow the air to escape. A tight foot valve will keep the pump constantly primed, and so it may be used for automatic pump operation. It must be inspected frequently, however, to see that it does not develop leaks and thus allow the pump to be started dry.

When neither of these methods of priming is practicable, the pump may be primed by the use of a vacuum pump to exhaust the air from the pump casing and suction line. A wet vacuum pump is preferable, as it will not be injured if fluid enters it. When a dry vacuum pump is to be used, the installation must be such as to prevent fluid being taken into the air pump. This may be done by having the pipe leading from the pump to the air pump installed with a vertical rise of over 35 ft.

Careful attention to the priming method when the pump is installed may save annoyance later due to improper priming equipment.

Starting . . . The pump must not be started without being primed. Be sure that the driver rotates in the proper direction. This is usually indicated by a direction arrow on the pump casing.

A high or medium-head centrifugal pump, when primed and operated at full speed with the discharge gate valve closed, requires much less power than when operating at its rated capacity and head with the discharge gate valve opened. For this reason, it is advantageous that the gate valve always be closed when the pump is being started. It is to be noted, however, that in general the lower the normal operating head, the less does the closing of the discharge gate valve affect the power required at normal capacity; until at extremely low heads such as for low head, large volume irrigation pumps, where the design approaches the mixed flow type of pump, the shut-off horsepower may equal or exceed the horsepower required with discharge valve open.

Pumps of the mixed-flow type frequently require more horsepower with the discharge valve shut than with it open. Propeller-type pumps nearly always require a great deal more power at shutoff than at rating and must be started with the discharge valve open. The manufacturer's instructions should be consulted for characteristics of such pumps.

Stuffing boxes . . . Do not draw glands tight. A slight flow of pumped fluid from the stuffing boxes (if permissible) when the pump is running keeps packing in good condition.

Wearing rings . . . Wearing rings are fitted to the casing and usually on the impeller around the inlet to reduce the quantity of fluid leaking back from the high-pressure side to the suction side. These wearing rings are fitted with a small clearance and depend on pumped fluid for lubrication. They will eventually wear and permit more fluid to pass back to the suction. Rate of wear depends on character of pumped fluid.

Stopping . . . Before stopping the pump, close gate valve. This will prevent fluid hammer on check valve.

*This material is taken from "Standards of the Hydraulic Institute," ninth edition, by permission of the institute

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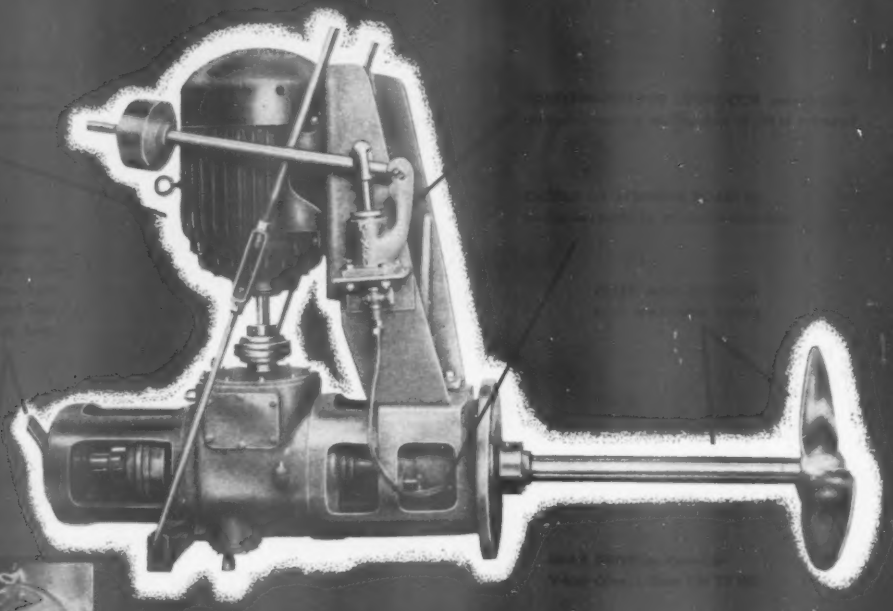

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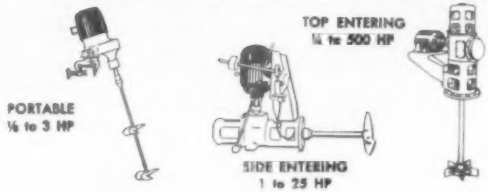

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No. 129

REFINER'S NOTEBOOK

Open System . . . Or Closed System?

. . . for relief-valve discharge

by S. Chesler* and B. W. Jesser†

AS an aid in deciding whether a closed or open system should be used, the Bosanquet - Pearson equation may be used. In essence these diffusion equations define the action of smoke or gases as they leave a stack, turn downwind and cone out. At some point downwind the cone reaches the ground and there the gases are reflected. The point of maximum ground concentration is somewhat downwind of the point where the cone first reaches the ground.

Swift and Murphy[1] used these equations to calculate the maximum ground concentration that would be expected when the relief valves popped on an alkylation unit. Assuming a 1-mile wind, they arrived at a concentration range of 0.44 to 0.55 per cent by volume which is well below the minimum limit of explosibility[2] of any gas likely to be encountered in that particular case.

The Bosanquet-Pearson formula is given as:

$$C = \left[\frac{W}{(2\pi)^{1/2} C_y C_z u x^2} \right] e^a \quad (1)$$

where

C = gas concentration in lb. per cu. ft. of air at any point x, y on the ground
W = weight discharged, lb. per hour
C_y = horizontal diffusion coefficient
C_z = vertical diffusion coefficient
u = mean wind velocity, ft. per hour
x = distance from base of stack downwind, ft.
h = effective stack height, ft.
y = distance crosswind from the discharge stream centerline, ft.

$$a = -\frac{h}{C_z x} - \frac{y^2}{2C_y^2 x^2}$$

On differentiation, the location of the maximum ground concentration is shown to be at:

$$x = h/2C_z \text{ when } y = 0 \quad (2)$$

And the maximum ground concentration is given as:

$$C_{max} = \frac{0.216W}{uh^2} (C_z/C_y) \quad (3)$$

In order to facilitate the use of the Bosanquet-Pearson Equation 3 a plot (Fig. 1) has been prepared showing the discharge rate of vapor versus maximum ground concentration for various stack heights. This plot is based on a wind velocity of 1 mile per hour and a C_z/C_y ratio of 1.0. Results from Fig. 1 should be corrected for the appropriate ratio of C_z/C_y.

References

1. Swift, J. J., and J. J. Murphy, M. W. Kellogg Co., Development Report (1950) unpublished.

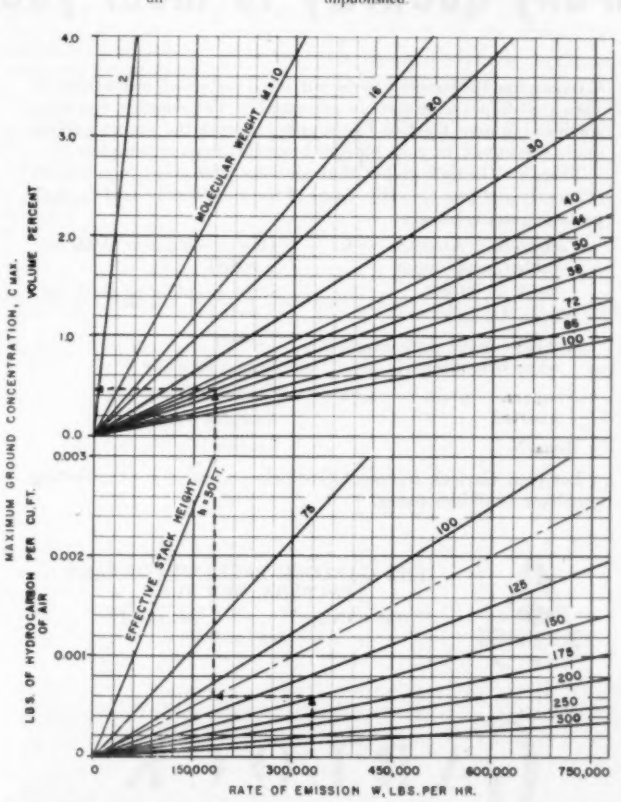

Fig. 1—Maximum ground concentration vs. rate of emission for various stack heights. Basis: Bosanquet-Pearson equation.

*Piping engineer and †head, piping analytical section, M. W. Kellogg Co. From paper presented at A.S.M.E. Toronto meeting, 1951.

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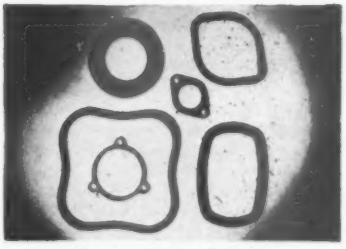

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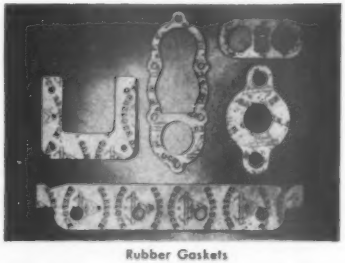

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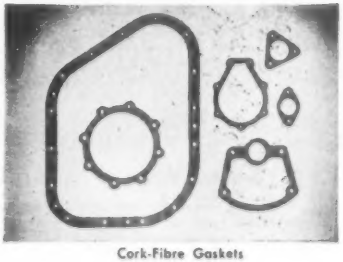

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by **W. L. Nelson**
Technical Editor

QUESTIONS ON TECHNOLOGY

Yields By Coking

"Have you data similar to those of the March 31, 1952, issue on the yields of gasoline when coking?"—S. R. C.

Coking yields are less well understood because coking is not an economic operation except when the price of residual fuel oil is very low or unless there is a market for the coke as in some industrial areas. However, the meager data listed at the end of this discussion were analyzed to obtain the two following equations:

$$Y = 28 + 1.75\ A_R$$

$$Y = 28\ (1 - X) + 1.75\ A_R - 1.5\ XA_{GO}$$

in which:*

Y = volume per cent gasoline, 400° e.p.—10 lb. R.v.p.
X = volume per cent gas oil product
A_R = A.P.I. gravity of residual coking stock
A_{GO} = A.P.I. gravity of the gas oil product

It is obvious that such equations must be used with care because they apply only to the production of yields (X) of gas oil that are possible by a material balance, and because the amount of gas oil produced is somewhat related to the amount of gasoline produced. Accordingly, Table 1 was prepared as an indication of the limitations of the equations.

The amount of gas and coke can be estimated by means of material balances of the yields of gasoline and gas oil taken from Table 1. Gas constitutes about one-third of the combined weight of gas and coke, increasing somewhat for higher gravity charge stocks at the expense of gasoline yield.

Illustration . . . In coking a 14° A.P.I. residuum for a maximum yield of 22° A.P.I. gas oil, the yields from Table 1 are found to be 3.2 per cent gasoline and 80 per cent gas oil. The weight of gas and coke can be obtained by the following material balance (100 gal. charge):

Stock—	A.P.I.	Lb./gal.	Liq. vol. per cent	Weight, lb.	Weight, per cent
Charge stock	14	8.099	100.0	809.9	100.0
Gasoline	54	6.350	3.2	20.3	2.5
Gas oil	22	7.676	80.0	614.0	75.8
Gas and coke				175.6	21.7
Gas (1/3)				58.5	7.2
Coke				117.1	14.5

Gas per bbl. = 58.5 × 0.42 = 24.6 lb.
Coke per bbl. = 117.1 × 0.42 = 49.2 lb.

This amounts to about 350 cu. ft. of gas per barrel and about 25 tons coke per 1,000 bbl.

The yield of coke when no gas oil is produced is very much larger, and the tons per 1,000 bbl. (C) can be estimated from:

$$C = 99 - 3.4\ A_R + 0.03\ (A_R)^2$$

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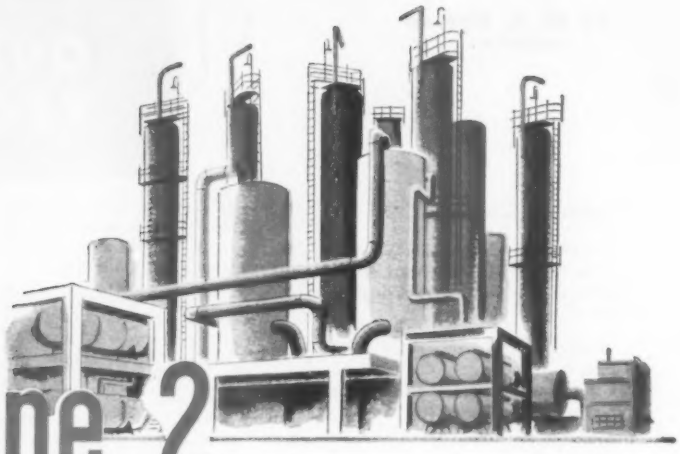
6. Curran, M. D., The Oil and Gas Journal, August 18, 1949, p. 100.
7. Foster, A. L., Pet. Engineer, April 1951.
8. Diwoky, R. J. The Oil and Gas Journal, November 18, 1938.

TABLE 1—GASOLINE VOLUME PER CENT YIELDS (COKING) WHEN PRODUCING VARIOUS AMOUNTS OF GAS OIL

Feed,* A.P.I.	No gas oil 0	Amounts of 18° A.P.I. gas oil 50%	60%	70%	80%	Amounts of 22° A.P.I. gas oil 50%	60%	70%	80%	Amounts of 26° A.P.I. gas oil 40%	50%	60%	70%	80%
4	35.0	7.3	1.7			4.3				8.0	1.2			
5	36.75	9.05	3.45			6.05				9.75	2.95			
6	38.5	10.8	5.2			7.8	1.6			11.5	4.7			
7	40.2	12.5	6.9	1.5		9.5	3.3			13.2	6.4			
8	42.0	14.3	8.7	3.2		11.2	5.1			15.0	8.2	1.5		
9	43.8	16.0	10.4	5.0		13.0	6.8	0.8		16.7	10.9	3.3		
10	45.5	17.8	12.2	6.7	1.1	14.8	8.6	2.5		18.5	11.7	5.0		
11	47.3	19.5	13.9	8.5	2.8	16.5	10.3	4.3		20.2	13.4	6.7		
12	49.0	21.3	15.7	10.2	4.6	18.3	12.1	6.0		22.0	15.2	8.5	1.7	
13	50.8	23.0	17.4	12.0	6.3	20.0	13.8	7.8	1.5	23.7	16.9	10.2	3.4	
14	52.5	24.8	19.2	13.7	8.1	21.8	15.6	9.5	3.2	25.5	18.7	12.0	5.2	
15	54.2	26.5	20.9	15.4	9.8	23.5	17.3	11.2	5.0	27.2	20.4	13.7	6.9	0.2
16	56.0	28.3	22.7	17.2	11.6	25.3	19.1	12.9	6.7	29.0	22.2	15.5	8.7	2.0
17	57.7	30.0	24.4	18.8		27.0	20.8	14.7	8.5	30.7	24.9	17.2	10.4	3.7
18	59.5	31.8	26.2			28.8	22.6	16.4	10.2	32.5	26.7	19.0	12.2	5.5
19	60.2					30.5	24.3	18.2	12.0	34.2	28.4	20.7	13.9	7.2
20	63.0					32.3	26.1	20.0		36.0	29.2	22.5	15.7	9.0
21	65.0					34.0	28.8			37.7	30.9	24.2	17.4	10.7
22	66.8									39.5	32.7	26.0	19.2	12.5
23	68.5											27.7	20.9	
24	70.3													

*Residual stocks.



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WHEN TO USE: If you are depending upon a solutizer process and have trouble in economically obtaining "Doctor" sweet gasoline, we recommend that Tenamene 2 inhibitor-sweetening be investigated as an adjunct to your present process. When Tenamene 2 inhibitor-sweetening and solutizer sweetening are combined, a considerable reduction in heat costs and a saving in time and equipment can frequently be realized, due to the decrease in recycling necessary in the solutizer units. The small amount of disulfides remaining in the gasoline after this combination treatment does not seriously affect tetraethyl lead susceptibility.

Where oxidation processes such as Copper sweetening or Doctor sweetening are used, we recommend that Tenamene 2 inhibitor-sweetening be considered as a replacement. While this process is also one of oxidation, it not only eliminates the dangers of copper or free sulfur contamination, but also eliminates the costly regeneration of the treating agents.

HOW TO SWEETEN WITH TENAMENE 2: Sour gasoline is first freed of hydrogen sulfide, organic acids and the more reactive mercaptans by a conventional caustic wash. 4 to 26 pounds of Tenamene 2 per 1,000 bbls. of gasoline are then added along with approximately 10 volume percent of 10° to 20° Baume caustic and air or oxygen. The resulting mix is thoroughly agitated and piped to a settler. The effluent from the settler is handled in the same manner as the effluent from conventional sweetening units, except that no more inhibitor is required.

Whatever your present sweetening process, it will pay to investigate Tenamene 2 inhibitor-sweetening. The staff of our gasoline laboratories will be pleased to work with you in determining how this process can be most effectively used in your refinery. Contact your local representative or write to Tennessee Eastman Company, Division of Eastman Kodak Company, Kingsport, Tennessee.

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by W. L. Nelson
Technical Editor

COST-imating

New Items to Appear in Quarterly Cost Indexes

THE Bureau of Labor statistics of the U. S. Department of Labor, under the able direction of Edward D. Hollander, has recently greatly expanded the number of items carried in its publications entitled "Wholesale Prices," and has revised the basis of its indexes from the year 1926 to the years 1947-1949. Many new and useful items of equipment or material have been made available, and the most useful of these will be included on the itemized cost index pages of The Oil and Gas Journal that are published each quarter (January, April, July, and October). The meaning of the 44 equipment items that are shown on the back of this page and which will also appear in future quarterly itemized cost index pages of Cost-imating are:

(1) Code 10-7-2: Boilers, tanks, and sheet metal products—Small pressure and fuel tanks, small and medium storage tanks, gas cylinders and truck tanks.

(2) Code 13: (Building materials) **Nonmetallic minerals, structural**—Glass, concrete ingredients and products, clay products, gypsum products, asbestos and asbestos shingles, etc.

(3) Code 13-4-1: Building brick.

(4) Code 13-4-2: Fire-clay brick, first quality.

(5) Code 10-1-5: (Castings) **Foundry and Forge Shop**—Gray iron, ingot molds, car wheels, pressure iron pipe, sewer pipe, steel, castings, and steel forgings.

(6) Code 13-4: (Clay products) **Structural clay products**—Building, fire clay and face brick; drain, partition and wall tile; sewer pipe.

(7) Compressor,* 1,000-hp. LTC8, gas-engine drive, 16-in. cylinder.

(8) Code 13-2: Concrete ingredients—Sand, gravel, crushed stone and cement.

(9) Code 13-3: Concrete products—Building block and culvert pipe.

(10) Code 11-7: Electrical machinery and Equipment—Instruments, motors and generators, transformers, switchgears, welding machines, lamps, and batteries.

(11) Code 11-7-3: Motors, generators, and motor generator sets—Two d.c. motors; seven a.c. motors ¼-225 hp.; and engine, steam, and water-driven generators.

(12) Code 11-7-4: Transformers and power regulators—15—5,000 kva.

*More complete information will be available each year from the Bureau of Labor statistics.

(13) Code 11-5-4: (Engines) **Internal combustion**—Four gasoline 3-104 hp.; and four diesel 53-500 hp.

(14) Gasoline engine*—175 hp., BBG-5.

(15) Diesel engine*—700 hp., DD-8.

(16) Heat exchangers.

(17) Code 11-4-7: Fans and blowers (except portable)—Centrifugal and a propeller fan.

(18) Code 10-4-2: Hand tools—Six edge tools, eight mechanic's tools, files, saws, shovel, hammer, hoe, and trowel.

(19) Instruments (composite of items 20-28).

(20) Flow meter—mechanical recording.

(21) Flow meter—Air control mechanical.

(22) Flow meter—Remote pneumatic, transmitter and receiver (air control).

(23) Potentiometer—Six-point recorder.

(24) Potentiometer—Air control recorder.

(25) Pressure controller—Recorder.

(26) Pressure gage—0-1,000 lb., 6-in. steel.

(27) Thermometer—Recording controlling (100-ft. tubing and socket).

(28) Control valve—2-in. cast steel.

(29) Code 13-7-2: Insulation materials—Only mineral-wool types.

(30) Code 8-1: Lumber—Forty-nine items of Douglas fir, southern pine, other softwoods and hardwoods.

(31) Code 8-1-2: Southern pipe—Nine items.

(32) Code 8-1-3: Other softwoods—Fifteen items of Ponderosa, sugar pine, white pine, redwood, cypress, hemlock and cedar.

(33) Code 11-4: Machinery, general purpose and equipment—Pumps, air compressors, elevators, industrial furnaces, conveyors, hoists, industrial trucks, etc.

(34) Code 11-2: Construction machinery and equipment—Power cranes, draglines, shovels, and attachments; dozers, loaders, ditchers, rippers, portable pumps, and compressors; scrapers, graders, mixers, spreaders, and tractors.

(35) Code 11-5-1: Oil-field machinery—Twenty-nine items including rigs, pumps, blocks, slips, bits, derricks, rods, packers, etc.

(36) Code 6-2: Paint and paint materials—Paints, pigments, oils, etc.

(37) Code 6-2-1: Prepared paint—Seven kinds.

(38) Code 13-4-5: Pipe, sewer—Vitrified clay, 8 in.

(39) Code 11-4-1: Pumps and compressors—Reciprocating, turbine, centrifugal, and rotary pumps; air compressors 100-125 hp.

(40) Centrifugal pumps*—Cast iron, 60 g.p.m., 150 ft. head, 7½ hp.; steel 900 g.p.m., 250 ft., 75 hp., high temperature (no motors).

(41) Reciprocating pumps*—Cast iron, 6 by 4 by 6 duplex, 250 lb.; semisteel 8 by 4 by 12 simplex close clearance, 600 lb.

(42) Code 10-1: Iron and steel—Ore, scrap, semifinished, finished, foundry products, pig iron, and ferro alloys.

(43) Code 10-1-4: Finished steel—Rails, bolts, bars, plates, structural, sheets, strip, pipe, tubes, wire, nails, fence, etc.

(44) Code 11-4-9: Valves and fittings—Six bronze, iron, and steel valves; four fittings; and seven bearing items.

How to Compute the Nelson Index

The Materials Component consists of two items from the Bureau of Labor Statistics "Wholesale Prices," U. S. Department of Labor (Code 10-1 Iron and Steel, and Code 13 Building Materials), and a miscellaneous equipment average obtained mainly from manufacturers and published each month on the Refinery page of The Oil and Gas Journal in the Nelson Refinery Construction Index box. The costs are percentages of the cost in the year 1946. The Materials Component (40 per cent of total index) for the month of March 1952 may be computed as follows:

Bur. of Labor—	Iron and steel	Building materials
1946 index	74.0	69.1
March 1952 index	123.2	112.9
Index relative to 1946	166.5	163.4

Iron and steel	0.6 × 166.5 =	99.9
Building materials	0.2 × 163.4 =	32.7
Miscellaneous*	0.2 × *145.2 =	29.0
Materials component		161.6

*See The Oil and Gas Journal Refining page.

The labor component is half skilled and half common labor, taken from the Engineering News Record:

Eng. News Record—	Skilled	Common
1946 wage rate	$1.80	$1.033
March 1952 wage rate	2.77	1.664
Index relative to 1946	153.9	161.1

Skilled	0.5 × 153.9 =	76.95
Common	0.5 × 161.1 =	80.55
		157.5

COST-imating (continued)

The Nelson Refinery Construction Index consists of 60 per cent labor (because of the unfinished state of the iron and steel materials):

Materials	$0.4 \times 161.6 =$	64.6
Labor	$0.6 \times 157.5 =$	94.5
Nelson index		159.1

This method of computation is not different from the method originally used in the December 15, 1949 (page 91) issue of The Oil and Gas Journal (the last or No. 61 issue of the Cost-imating series). However, the Revised Building Materials (Nonmetallic Minerals, Structural) item, Code 13 of the Bureau of Labor Statistics, is somewhat different from the older Building Materials (Component). The old composite (used until 1952) and the new code (to be used henceforth) are related as follows:

	Old building materials composite	New Code 13 non-metallic structural
1946	100	100
1947	135.5	136
1948	153	147.1
1949	145.8	151.2
1950	155.4	154.8
1951	170	164.3

Likewise, in the future, the more complete Bureau of Labor Codes on Pumps and Compressors, Electrical Machinery, and Internal-Combustion Engines will be used for the miscellaneous equipment average rather than somewhat limited information from manufacturers.

Itemized Cost Indexes

(Multiply the 1946 prices of the Cost-imating Series by these Index Numbers divided by 100.)

	1948	1949	1950	1951	Feb. 1952	References*	Index for earlier years (The Oil and Gas Journal unless noted) Costimating
Labor:							
Skilled construction	125.0	133.9	140.0	148.3	153.2	Eng. News Record	No. 55—Nov. 3, 1949
Common labor	131.0	140.4	148.1	156.8	160.6	Eng. News Record	No. 55—Nov. 3, 1949
Refinery construction	128.0	137.1	144.0	152.5	156.9		No. 61—Dec. 15, 1949
Refinery operation	126.0	132.9	137.6	149.0	151.5	Sur. of Current Business	No. 55—Nov. 3, 1949
Equipment or materials‡:							
(1) Boilers, tanks and sheet metal	†140.0	†134.8	†136.0	†156.1	†154.4	Code 10-7-2	April 21, 1952§
(2) Bldg. materials (nonmetallic)	147.1	151.2	154.8	164.3	163.4	Code 13	No. 22—Mar. 17, 1949
(3) Brick—building	122.8	127.7	132.5	141.2	141.1	Code 13-4-1	
(4) Brick—fireclay	133.3	139.8	153.4	165.3	165.5	Code 13-4-2	
(5) Castings (foundry products)	144.6	150.5	152.9	167.2	168.2	Code 10-1-5	No. 46—Sept. 1, 1949
(6) Clay products (structural, etc.)	121.3	126.0	134.6	145.2	145.0	Code 13-4	
(7) Compressor	118.0	120.0	118.8	138.1	138.1	Manufacturer	No. 36—June 23, 1949
(8) Concrete—ingredients	119.4	123.7	125.3	132.7	132.9	Code 13-2	No. 22—Mar. 17, 1949
(9) Concrete—products	118.9	121.7	124.4	132.8	132.5	Code 13-3	
(10) Electrical machinery	127.6	130.9	134.9	154.3	154.1	Code 11-7	
(11) Electrical motors & generators	126.6	128.7	135.0	155.8	156.0	Code 11-7-3	No. 31—May 19, 1949
(12) Electrical transformers, etc.	127.0	129.7	131.6	147.7	147.6	Code 11-7-4	No. 31—May 19, 1949
(13) Engines (composite)	116.9	124.8	126.0	146.1	149.1	Code 11-5-4	No. 36—June 23, 1949
(14) Engines (gas)	122.0	117.0	121.8	134.6	134.6	Manufacturer	No. 36—June 23, 1949
(15) Engines (diesel)	117.0	114.0	114.0	139.7	139.7	Manufacturer	No. 36—June 23, 1949
(16) Exchangers	†130.0	†133.0	†140.0	†152.0	163.0	Manufacturer	No. 2—Oct. 28, 1948
(17) Fans and blowers	131.3	152.2	162.9	190.1	185.5	Code 11-4-7	Feb. 17, 1949§
(18) Hand tools	125.2	134.0	143.2	154.2	154.4	Code 10-4-2	
(19) Instruments (composite)	120.0	123.1	127.8	142.3	142.4	Manufacturer	No. 34—June 9, 1949
(20) Flow meter (mechanical)		109.2	114.0	126.8	126.8	Manufacturer	No. 34—June 9, 1949
(21) Flow meter (air control)		132.4	138.5	157.6	157.6	Manufacturer	No. 34—June 9, 1949
(22) Flow meter (remote)		130.2	135.5	151.7	151.7	Manufacturer	No. 34—June 9, 1949
(23) Potentiometer, 6-point		125.8	134.0	146.6	146.6	Manufacturer	No. 34—June 9, 1949
(24) Potentiometer, air control		131.6	134.1	136.8	136.8	Manufacturer	No. 34—June 9, 1949
(25) Pressure controller		130.2	135.6	153.3	153.3	Manufacturer	No. 34—June 9, 1949
(26) Pressure gage		100.0	101.2	108.6	108.6	Manufacturer	No. 34—June 9, 1949
(27) Thermometer (recording)		118.6	124.0	144.3	144.3	Manufacturer	No. 34—June 9, 1949
(28) Control valve		127.8	133.3	155.5	155.5	Manufacturer	No. 34—June 9, 1949
(29) Insulation materials	126.8	123.6	125.0	128.8	129.3	Code 13-7-2	
(30) Lumber (composite)	181.0	165.3	193.0	208.5	203.3	Code 8-1	No. 7—Dec. 2, 1948
(31) Lumber (Southern Pine)	174.3	157.7	176.9	189.1	190.4	Code 8-1-2	No. 7—Dec. 2, 1948
(32) Lumber (other soft woods)	206.5	203.9	230.2	252.7	245.3	Code 8-1-3	
(33) Machinery—general purpose	124.9	131.9	136.7	153.0	152.8	Code 11-4	Feb. 17, 1949§
(34) Machinery—construction	127.8	136.0	140.1	155.3	156.9	Code 11-2	
(35) Machinery—oil field	†125.9	†132.9	†135.8	†149.6	†149.8	Code 11-5-1	
(36) Paint and paint materials	143.0	141.2	136.9	153.9	154.1	Code 6-2	No. 22—Mar. 17, 1949
(37) Paints—prepared	141.4	142.8	140.0	153.8	154.6	Code 6-2-1	
(38) Pipe, sewer	†119.1	†119.3	†129.9	†147.1	†147.1	Code 13-4-5	No. 22—Mar. 17, 1949
(39) Pumps, air compressors, etc.	127.0	135.9	138.2	155.9	155.1	Code 11-4-1	No. 29—May 5, 1949
(40) Pumps—centrifugal	120.0	118.0	128.1	136.2	136.2	Manufacturer	
(41) Pumps—reciprocating	138.1	144.6	143.9	183.3	183.3	Manufacturer	
(42) Steel (iron and steel)	141.1	143.3	152.9	166.7	166.5	Code 10-1	No. 61—Dec. 15, 1949
(43) Steel—finished steel	160.4	173.8	182.6	196.9	197.6	Code 10-1-4	
Steel—plate and sheet		(See boilers, tanks, etc., above)					
(44) Valves and fittings	†125.9	†132.9	†135.8		†186.2	Code 11-4-9	No. 46—Sept. 1, 1949
Marshall-Stevens equipment (only) indexes:							
Process industries (average)	131.5	131.5	135.8	144.9	144.9	Chem. Eng. May 1952	Chem. Eng. Feb. 1951
Chemical	130.0	130.0	133.8	142.5	142.6	Chem. Eng. May 1952	Chem. Eng. Feb. 1951
Petroleum	132.0	132.0	136.5	145.6	145.7	Chem. Eng. May 1952	Chem. Eng. Feb. 1951
Electrical power	135.0	135.0	139.3	148.3	148.4	Chem. Eng. May 1952	Chem. Eng. Feb. 1951
Refrigeration	141.0	139.9	147.3	159.2	159.3	Chem. Eng. May 1952	Chem. Eng. Feb. 1951
Steam power	132.0	132.0	136.6	146.5	146.6	Chem. Eng. May 1952	Chem. Eng. Feb. 1951
Nelson Refinery Construction	132.5	139.6	146.2	157.2	159.3	[illegible]	No. 61—Dec. 15, 1949

*Code refers to the revised index code number of the Bureau of Labor Statistics, U. S. Department of Labor, "Wholesale Prices." †Estimated base value for 1946. ‡Not exactly the same items as those published heretofore. §Questions on Technology.

Oil-Well Cementing Materials—2

by C. D. Saunders* and F. W. Nussbaumer*

DESIRED properties for oil well cements were discussed in the last issue. Certain additives which enhance these properties are discussed here.

Bentonite or "gel," a special sodium aluminum silicate clay which has the property of absorbing great quantities of water, has been used for many years in oil-well cements. Due to the former belief that high strengths were required, the amount used was usually 2 or 3 per cent with 6 per cent being about the maximum.

As shown in Table 1, an increase in bentonite requires an increase in water to maintain proper slurry properties with a resulting increase in slurry volume and a decrease in slurry weight. The table gives data obtained on slurries prepared with both maximum and minimum water ratios and containing zero to 20 per cent bentonite by weight of cement.

Table 2 gives data of the strength developed by various gel-cement mixtures in 24 hours when cured at 100° and 140° F. With all percentages of bentonite up to 20 per cent, the slurries set with strengths sufficient to measure in 24 hours.

The thickening times for gel-cement slurries are affected only slightly by the addition of bentonite and water. In no case has it been found in the laboratory (when using the proper amount of water) that the addition of bentonite to A.S.T.M. Type I (regular) cement has resulted in a slurry which is not safe to use at well depths in which this type of cement is normally considered satisfactory.

The lower compressive strengths obtained with bentonite cement results in a set cement which exhibits properties that enable it to be perforated with less bullet resistance and less shattering.

No discussion on the use of bentonite in slow-setting cements is being offered because the action of gel on this type cement will vary considerably with each brand. For this reason, very few general statements can be made which will apply to all slow-setting cements containing various amounts of bentonite.

Dispersants

Some companies advocate the use of dispersing agents in conjunction with high percentages of gel (10 per cent or more) in cement slurries. The common dispersing agents being used are calcium lignon sulfonate compounds which tend to disperse the solid particles in the slurry to the extent that much smoother, more fluid slurries can be obtained with conventional cementing equipment.

Data concerning the thickening times which can be obtained by the use of this type agent as an additive to high gel-cement slurries compare with those obtained using manufactured slow-setting cements.

The amount of dispersing agent used should vary with the temperature conditions in which it is being used. At the lower temperatures, excessive amounts of the additive may slow the setting action to the extent that the slurry would be unset or too weak in the required time. For this reason, most companies using this type agent have set up definite amounts to be used at various temperatures. These range from 0.2 to 0.8 per cent of the additive by weight of cement.

Cellophane flakes are being used in many areas as an aid for combating lost returns. These flakes are thin sheets of cellophane about 3/8 to 3/4 in. in diameter which will screen out of a slurry going into a permeable zone, building a bridge through which no more slurry will pass.

Only small amounts of this material are required, with 1/4 to 1/2 lb. per sack of cement being the most common. It is being used in neat as well as the gel-cement slurries, and its use has become standard practice by many companies in some areas.

Most fibrous materials should not be used as lost-circulation additives in cement slurries since they tend to destroy the setting properties of the cement. Cellophane flakes being inert do not cause any detrimental effect on the slurry characteristics.

*Halliburton Oil Well Cementing Co. Summary of paper presented at A.P.I. production meeting, Mid-Continent district, Wichita, March 19-21.

TABLE 1—PROPERTIES OF GEL-CEMENT* SLURRIES

	—Maximum water ratio—			—Minimum water ratio—		
Per cent gel	Water gal. per sack	Weight lb. per gal.	Volume cu. ft. per sack	Water gal. per sack	Weight lb. per gal.	Volume cu. ft. per sack
0	5.5	15.40	1.22	3.90	16.85	1.00
2	6.5	14.70	1.36	5.05	15.90	1.17
4	7.7	14.10	1.53	5.95	15.15	1.30
6	8.8	13.65	1.69	6.55	14.75	1.40
8	9.7	13.30	1.82	7.30	14.35	1.51
10	11.1	12.95	2.02	8.50	13.80	1.67
12	12.3	12.60	2.19	9.75	13.35	1.85
14	13.8	12.25	2.40	10.05	13.25	1.91
16	15.2	12.00	2.60	11.10	13.00	2.06
18	16.6	11.80	2.80	11.60	12.90	2.14
20	18.2	11.60	3.03	12.10	12.80	2.21

*A.S.T.M. Type I cement.

TABLE 2—TWENTY-FOUR HOUR COMPRESSIVE STRENGTHS OF GEL-CEMENT* PSI.

	—100° F.—		—140° F.—	
Per cent Bentonite	Max. water	Min. water	Max. water	Min. water
0	2,400	4,790	4,060	8,500
2	2,032	3,170	2,960	4,080
4	1,220	2,030	1,830	3,270
6	850	1,580	1,300	2,790
8	728	1,440	1,170	2,510
10	670	910	1,050	1,660
12	395	940	620	1,020
14	245	620	380	1,010
16	152	420	270	720
18	120	290	220	640
20	97	280	150	490

*A.S.T.M. Type I cement.

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TRADE LITERATURE

1 BOLT CUTTERS. Bulletin No. 521 describes mill-type bolt cutter with reversible jaws and forged steel handles, which employs reversible cutting blades. It also describes Model 200-A Guillotine hand-operated hydraulic cutter, which is 21 in. long and weighs 12 lb. Capacity and operation data are given. *Manco Manufacturing Co.*

2 NELSON LIQUID DRIVES, a six-page multicolored bulletin, describes traction sheaves for belt-driven installations, traction-flexible couplings for hub-mounted installations, and traction-hub mounted for special installations. Specification charts and installation arrangement drawings are included. *Liquid Drive Div., G. E. Nelson Co.*

3 ALUMINUM FASTENINGS. Complete catalog covers sizes and types of bolts, screws, self-tapping screws, nuts, washers, rivets, and accessories to meet practically any need. *The H. M. Harper Co.*

4 ACCURATE OIL FIELD MAPS is a series of data sheets describing regional and basin maps available for oil and gas regions of the Rocky Mountains, and includes size scale and prices on both cloth and paper along with detailed descriptions. *Chemical & Geological Laboratories.*

5 SPACELITER. Bulletin No. 133-52 illustrates and describes porcelain-enamel elliptical floodlight, with reflector finished inside and out in vitreous-fired porcelain enamel. Available for a wide variety of lamps—general service types PS, 300 to 1,500 watts; Bi-post type T-24, 750 and 1,000 watts, and mercury-vapor type T-16, 400 watts. Mounting brackets for wall, crossarm, clamp, or pole top. *Steber Manufacturing Co.*

6 FIBERGLAS SAFETY HELMETS AND CAPS are described and illustrated in a two-page data sheet. Required accessories are available such as chin straps, lamp brackets, and winter linings, and a choice of five standard colors—brown, white, red, green, and yellow. *Industrial Products Co.*

7 STAINLESS STEEL—RIGHT OFF THE SHELF, new 20-page catalog provides detailed product specifications to aid in selecting and ordering stainless-steel fastenings. Specifications such as measurements and materials are clearly listed in easily read chart form. Product categories include all types of screws, nuts, bolts, washers, pins, studs, rivets, and nails. *Star Stainless Screw Co.*

8 GENUINE ALEMITE LUBRICATION FITTINGS. Published as both a guide to specifying and to speed detailing, a set of data sheets lists and illustrates all standard models of Alemite lubrication fittings. Hydraulic, push-type, pin-type, button-head, dot and flush-type fittings are included. *Alemite Division, Stewart-Warner Corp.*

9 MONO-BLOCK AND POWER-HOUSE is a four-page brochure featuring a combination of Mono-Block insulation, easily cut to fit odd-shaped

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, July 7, 1952

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or irregular surfaces, and Powerhouse cement, which is applied to insulating block surfaces. *Baldwin-Hill Co.*

10 B & W COLD-DRAWN MECHANICAL TUBING. New data card outlines advantages that accrue to manufacturers through the use of tubing in production of hollow precision parts. It also presents tables of tolerances and mechanical properties of seamless cold-drawn carbon steel mechanical tubing. *Tubular Products Div., The Babcock & Wilcox Co.*

11 STATIONARY DIESEL, Bulletin No. 5202, gives complete design features, capacity tables, and dimensions of Superior Model 65 stationary diesel engine. It also describes different 6 and 8-cylinder sizes available in capacities from 580 to 1,500 hp., gives specifications of component parts, and lists standard as well as extra equipment. *Engine Div., The National Supply Co.*

12 LIFE-LINE MOTORS. Over 100 case histories of outstanding applications of Life-Line motors are depicted in a new 35-page booklet. Included are actual applications in the chemical, petroleum, and machine and production-tool industries, illustrated with photographs or sketches, each giving particular application problems involved, motor choice for the job, and results. *Westinghouse Electric Corp.*

13 AIR-POWERED CONTROLLED VOLUME PUMPS, a 24-page, 2-color bulletin gives complete details of construction, operation and application of air-operated pumps and systems. Cutaway views of pumps, and illustrated diagrams of controls and typical air-powered systems are used to clearly describe method employed to harness air for controlled volume pumping. *Milton Roy Co.*

14 INSUL-MASTIC IN INDUSTRY is a 44-page catalog describing Gilsonite base protective coatings, properties, and subjected uses and tests. A special cork-filled coating is also described. Catalog contains numerous photographs of chemical vessels, industrial equipment, and buildings which have been protected by Insul-Mastic coatings. *Insul-Mastic Corp. of America.*

15 HIGH-PRESSURE TRIPLEX PUMP, a new six-page illustrated bulletin, covers general industrial applications of Kobe High-pressure Triplex pump. Shown and discussed are a number of standard applications calling for pressures up to 5,000 psi., as well as special applications where pressures up to 20,000 psi. are required. *Kobe, Inc.*

16 DESIGN PROPERTIES OF PIPE. Code changes, plus additional design information, have been added to this brochure which now includes complete data tables on pipe ranging from ⅛ to 24 in. o.d., and on seamless welding fittings, and forged-steel flanges. *Tube Turns, Inc.*

17 ALLEGHENY METAL IN THE PETROLEUM INDUSTRY. This 34-page book, profusely illustrated, is one of a series dealing with the use of stainless steel in the production and processing of oil in the petroleum industry. It discusses available forms of stainless steel, and includes a stainless-steel selector *Allegheny Ludlum Steel Corp.*

18 ROTARY DRILLING CUTOFF CHART. A simplified, easy-to-read rotary-drilling wire-rope cutoff chart printed in black and red on heavy, plasticoated stock, punched for hanging, shows approximate lengths of rope to cut, at proper intervals, according to rope and drill-pipe size, excess weights, and depth of hole. Reverse side contains hook load and lead line pull chart, and wire-rope recommendation chart for oil-field applications. *A Leschen & Sons Rope Co.*

19 LABLINE SECTIONAL FURNITURE, a six-page bulletin, describes and illustrates complete line of Labline sectional laboratory furniture, each unit standardized to give service and appearance of custom-built furniture. *Labline, Inc.*

20 TYPE E DRY CHEMICAL FEEDER designed and built to meet exacting requirements for feeding all dry chemicals for water purification and sewage or waste treatment is described in a two-color seven-page brochure. Details of construction and installation, dimensions and weights, and selection table are given. *Infilco Inc.*

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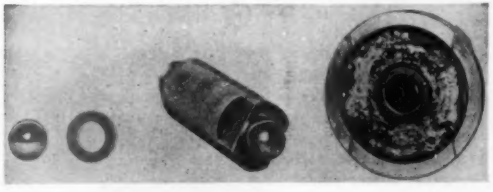
IT'S NEW CHECK IT

by Dan B. Miller

21 THOMPSON UNITIZED VACUUM TANK is designed to load, carry, discharge, and agitate industrial liquids and semisolids with different viscosities; for example, rotary mud, oil, water, brine, or chemicals. In the petroleum industry, the UVT is used in drilling, field production, processing, refining, and pipe-line operations. A unitized vacuum tank is a complete unit with apparatus needed to maintain either partial vacuum or pressure within the tank. Capacities are from 10 to 100 bbl. Each tank is individually designed, and manufactured to meet the purchaser's specifications as to kind of vacuum pump, tank capacity, and make and model of truck, trailer, semitrailer, or skid mount used for mobility. Many standard parts used to reduce building costs are maintained in stock. Several desirable accessories are available; for instance a spray bar to permit weed-oil and road-oil spraying. Typical uses for the UVT in oil-field operations are: move rotary mud to drill site; agitate rotary mud; handle caustic, acid, acid sludge, and brine; clean tank bottoms; oil-spray roads, drain sumps; pump out cellars; and spray weeds. *Thompson Tank & Manufacturing Co., Inc.*

IT'S NEW CHECK IT

22 CARBOLOY TUNGSTEN CARBIDE VALVE AND SEATS, which have been inspected after periods of operation up to 1 year, show no measurable wear, while maintaining consistent performance. The assembled carbide ball and seat shown is a working valve set that has operated in a continuous flow operation for 9 months. The excellent condition of this assembly is shown by comparison with the new carbide ball and seat at the left. No sign of wear, wire drawing, or corrosion is evident in the parts that have been in use. The well in which this valve was installed was 3,600 ft. deep and produced 450 bbl. of oil a day at 450-psi. pressure. The fluid in contact with the valve parts was 90 per cent salt water with a considerable amount of sand. *Carboloy Department of General Electric Co.*



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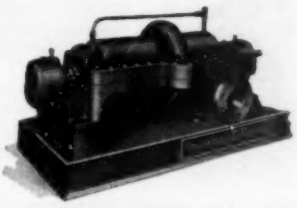
23 CLASS CNTA MULTISTAGE CENTRIFUGAL PUMPS. These pumps are intended for boiler-feed, refinery, and general industrial services to 800 lb. Built in 1½, 2, 2½, and 3-in. sizes, units are available with four, six, or eight stages. The pump features a horizontally split, smooth-bore cylindrical casing which contains the unit-type rotor assembly. This assembly is composed of the shaft, impellers, and channel rings, which contain the multiple-volute fluid passages. The entire rotor assembly is quickly and easily removed from and installed in the smooth-bore casing, since there are no mating-ring fits or delicate alignment problems. Back-to-back grouping of the impellers neutralizes axial thrust developed by the pressure differential across each individual stage. *Ingersoll-Rand Co.*



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24 BUTTERFLY VALVE. Designed for maximum pressures of 150 psi., these valves are recommended for use on drilling-mud lines, salt-water-disposal systems, suction lines, flow lines, and in vacuum service. Great flexibility is

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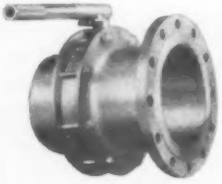
provided by the design which permits any combination of welded, flanged, or screwed ends to be used interchangeably on the main-body element. The bolted assembly permits quick removal and replacement of the ends and also permits the body element, which contains the seat and disk, to be removed from the line by removing a portion of the flange bolts. It is not necessary to disconnect the line at any other place. Valve disks can be furnished of steel, bronze, aluminum, or other specified materials. The valve rubber seats are oil-resistant and easily replaceable in the field. The valves are self-cleaning, require no lubrication and are equipped with automatic indexing locks to hold the disk in full open or full closed position. Furnished in sizes from 2 through 10 in.; all sizes are full opening for maximum flow. *Keystone Tool Corp.*



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25 SOLENOID VALVES FOR 0 TO 3,000 - PSI. SERVICE. The complete new line of "Shear-Seal" solenoid valves includes shutoff, two-way diverter, three-way and four-way selector models. Valves for air, water, and oil service come in three groups of pressure ranges; 0 to 250 psi., 0 to 1,500 psi., and 0 to 3,000 psi. *Barksdale Valves.*

IT'S NEW CHECK IT

26 NEW MODEL F-23DT is a high-speed truck-tractor powered by the new, lightweight Cummins JBS-600 diesel engine. Combination of the new, high - compression engine and a specially designed Reo chassis gives weight advantages. The standard F - 23DT chassis and cab with 20 gal. of fuel and all tractor equipment, except the fifth wheel, weighs approximately 9,475 lb. It has a gross tractor rating of 50,000 lb. and a 130-in. wheelbase. The engine develops 150 hp. at a governed speed of 2,500 r.p.m., and 360-ft.-lb. of torque at 1,400 r.p.m. Weight of the complete power plant, including clutch and transmission, is only 1,825 lb. *Reo Motors, Inc.*

IT'S NEW CHECK IT

27 RYDYLYME is a new scale remover for pipes and boilers. The fact that Rydlyme is completely safe is illustrated by a demonstration the company uses to show its noncorrosive yet fast-dissolving qualities. A particle of scale is held in the hand by a company representative and a small amount of Rydlyme is poured on the scale. In a few moments, the scale disappears into a harmless gaseous state. The liquid is packaged in glass gallon containers, 4 gallons per case. *Apex Engineering Co.*

IT'S NEW CHECK IT

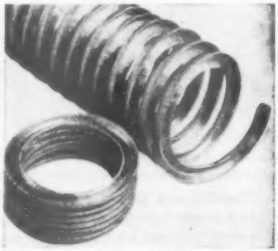
28 SEMIAUTOMATIC WELDING GANTRY. This specially designed gantry for semiautomatic welding units features a rapid, tridirectional adjustment for the welding gun. An added feature of this fixture is the easy access the operator has to all welding machine controls because the entire unit fits compactly on a caster stand beside the operator. All circumferential welds from practical minimum to 54 in. in diameter can be made with the illustrated standard rack. *Hillco, Inc.*

IT'S NEW CHECK IT

29 MODEL OIL-FIELD KIT. When assembled it shows, in complete detail, the exploration, drilling, production, and storage of oil. The kits contain all essential elements of a producing oil field including exploration parties, crewmen, four trucks and jeeps, a drill derrick, shot - hole drill rig, gravimeter operator, replica of a pumping well, and a flowing well. There are large drawings of underground strata showing what drillers must penetrate to find oil. The most important feature of the kit is the 32-page illustrated teaching handbook, together with six large pages of drawings, which enables any adult to give the necessary instruction for step-by-step assembling the balsa wood, dowels, buttons, dress snaps, and spools that make up the scale models. *Models of Industry, Inc.*

IT'S NEW CHECK IT

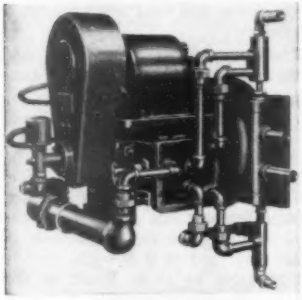
30 CONTINUOUS-VEE PACKING. Designed for 500-6,000 psi., and available in styles for either high or low temperatures, it is furnished in sizes from ¼ to 1 in., by 1/16-in. increments, 25 ft. per spiral. Packing size is the only dimension that need be given when ordering, as the user cuts his own rings on the job to fit specific rod and stuffing box dimensions. Continuous-Vee packing is offered in two styles. No. 2005 is constructed of the best asbestos cloth



and neoprene, and is recommended for high-temperature service on reciprocating steam or air rods, or hot-oil pumps. No. 2008 for lower temperatures is made of the best cotton duck and neoprene, and is recommended for hydraulic rams and outside packed plunger pumps, handling oil or water. Top and bottom adaptors in continuous form are available for both styles. *Mechanical Packing Division, Flexrock Co.*

IT'S NEW CHECK IT

31 SUPERIOR ROTARY BURNERS of the horizontal-rotary design, were developed primarily to achieve the complete combustion which results in highest efficiencies with greatest economy of fuel. Among important features are: horizontal-rotary design, V-belt drive for the high cup speed essential to efficient atomization; four-hole hinge to circulate oil through oil heater so that oil is on the pressure side of the pump; adjustable air nozzle which provides accurate control of flame contour; and dual pumps and reservoir which combine with constant oil rate control to provide controlled firing regardless of viscosity variation. The units burn any grade of oil, and are also available with combined gas burner for any type of gas. They are fully automatic in sizes to 500 b.h.p. with dual ignition, and hi-low or fully modulating control. *Superior Combustion Industries, Inc.*



IT'S NEW CHECK IT

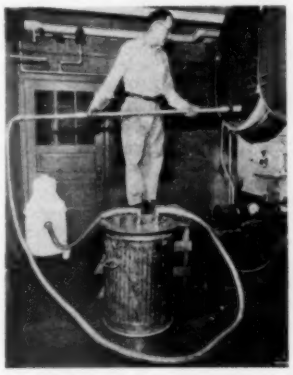
32 NEW EXPLOSIONPROOF FIXTURE HANGER. Meets the requirements of Underwriters' Laboratories, Inc., and the National Electrical Code. The new type EFHC hanger is essentially a T-fitting, the top two through-feed hubs for the lighting circuit conduit and the bottom hub for the fixture stem. A threaded cover is provided at the side of the hanger so that it directly faces the installing electrician. The fixture with stem and connecting wires can be assembled on the bench. The fixture stem may be threaded into the bottom hub of the hanger without the risk of twisting the connecting wires before connection is made to the circuit wires. A compact connection block is available for connecting the fixture wires to the circuit wires by means of two double terminals, or the wires may be spliced in the normal manner. *Crouse-Hinds Co.*

IT'S NEW CHECK IT

33 ANTISEIZE COMPOUND FOR DRILL PIPE. A new drill-collar and tool-joint compound definitely prevents the seizing and galling of threads on these tools. Compound 500 is basically a pure metallic lead compound in a consistency for easy application to drill collars, drill pipe, and bits. Its facility to fill all microscopically small voids provides a universally smooth thread surface, preventing abrasion and increasing the life of equipment. Its antiseize characteristic permits tight cinching of thread and easy break out. Compound will not harden, evaporate, oxidize, or corrode. Under regular working or storage conditions it will retain suspension. *Armite Laboratories.*

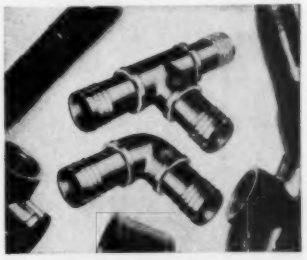
IT'S NEW CHECK IT

34 ADD-A-TANK converts any industrial vacuum for extra heavy-volume pickup. With these attachments one may add any standard 30-gal. or smaller galvanized ash can to the suction line of industrial vacuum. It operates on either wet or dry pickup with any brand industrial vacuum cleaner. It is fast and efficient on tough vacuuming jobs such as cleaning boiler flues, furnace fire boxes, large industrial chimneys, and machinery. Only the ash-can assembly need be in the hazardous area, while the vac is left outside and connected with a sufficient length of hose. Parts of the Add-A-Tank outfit include: cover plate assembly with 5 ft. of metal hose, 15 ft. metal hose assembly, extension pipes, flexible flue tool, flue scraper and wire brush tool. *Multi-Clean Products, Inc.*



IT'S NEW CHECK IT

35 NEW INSERT-TYPE ELL AND TEE COUPLINGS FOR FLEXIBLE PLASTIC PIPE. One fitting now effects a connection which formerly required the use of three or four. These new fittings are joined in the same manner as previously used for insert couplings. Sections of pipe can be cut with an ordinary handsaw prior to insertion of the fitting. Stainless steel clamps are tightened over the pipe and fittings to draw the pipe down onto the serrations of the insert, assuring a positive, leakproof joint. Connections can be completed in less than 2 minutes. When flexible plastic pipe is to be joined to a metal fixture or a previously installed metallic system, an insert adapter is used. One end is screwed onto the metal threads and then the plastic pipe is slipped over the serrated end and clamped securely. *Carlon Products Corp.*



NATURAL GAS

State Commissioners Favor Extension of Gas Controls

WASHINGTON.—State utility commissioners have recommended that natural-gas-expansion restrictions provided under PAD Order No. 2 be continued until there is a more comfortable balance between gas supply and demand.

Commissioners from 15 states attended a meeting here June 30 to discuss the gas order at the invitation of the Petroleum Administration for Defense.

Even those states which have certified to the President that their commissions would take over regulation of expansion think that the order has been helpful from a psychological standpoint.

Modifications of the order suggested by the state officials include:

1. Allowing suppliers in communities recently receiving gas to carry over to the succeeding year any deficiency in the 5 per cent new connections permitted under the order.

2. Changing from 1 to 2 per cent the number of new customers the suppliers may take on in communities previously supplied with gas.

3. Permitting smaller companies to forego annual reports to PAD on supply and demand, peak demand estimates, etc.

Panhandle Request to Cut Service at Detroit Denied

WASHINGTON. — Panhandle Eastern Pipe Line Co. will not be authorized to cut its natural-gas deliveries to Michigan Consolidated Gas Co., of Detroit, according to the Federal Power Commission.

The Panhandle firm had sought to cut deliveries from 125,000,000 cu. ft. to 87,500,000 cu. ft. daily—down 37,500,000 cu. ft. daily.

FPC said it denied the proposal because Panhandle has available to it an adequate supply of gas and an adequate pipe-line capacity to continue its present deliveries of the fuel at Detroit.

A shortage of gas would result on Michigan-Wisconsin Pipe Line Co.'s system particularly in the Detroit area, if Panhandle's proposed reduction had been allowed, FPC said.

Evidence establishes that, in the event of the cutback, there would be an annual deficiency of 4,155,480,000 cu. ft. in meeting the firm load on Michigan-Wisconsin's system, and that a presently existing annual deficit of 8,505,080,000 cu. ft. in meeting the special industrial load would be augmented by 9,532,020,000 cu. ft.

John Deere to Build Big Chemical Plant at Pryor

PRYOR. Okla.—John Deere Co., the world's second largest farm-implements manufacturer, has revealed that it will build a $20,000,000 chemical plant here to produce anhydrous ammonia, urea, and urea ammonia from natural gas.

Production principally will go into fertilizers, according to Lloyd E. Kennedy, vice president and treasurer of the company.

The company hopes to have the plant in operation early in 1954. It will be supplied with gas by Oklahoma Natural Gas Co., Tulsa, which will lay a large-diameter line from the Tulsa area. Planning for the line already is under way, and it is thought that it will probably be 18-in. Work on the line is scheduled tentatively to begin late this year.

Like a Boy With a New Toy

This oiler is at work in the engine room of Cities Service Gas Co.'s new compressor station at Greensburg, Kans. The station is on the company's 26-in. Hugoton pipe line which serves the Kansas City area.

Natural Gasoline

L.P.G. Costs Low Compared With Other Commodities

CHICAGO.—The cost of everything is up appreciably, but the cost of liquefied petroleum gas has advanced only 7 per cent during the past 10 years.

This was revealed by the LP-Gas Information Service here, following a nation-wide "spot survey" among leading marketers of the fuel.

In the 10-year period from April 15, 1942 to April 15, 1952, the average of all items included in the cost-of-living index released by the U. S. Bureau of Labor Statistics climbed 63 per cent. Food prices registered the sharpest gain, with a 92.3 per cent rise.

The Government's statistics are based on data supplied from 34 major cities.

Plant Nears Formal Opening

CRANE, Tex.—Formal opening of the Wilshire Oil Co., Inc.-Lone Star Gasoline Co. natural-gasoline plant 12 miles east of here in Upton County is scheduled for July 19.

Initially, the plant will process about 9,000,000 cu. ft. of natural gas per day from 28 producing oil wells, and output will be about 40,000 to 50,000 gal. of liquid products daily. Construction of gas-gathering facilities was completed early last month.

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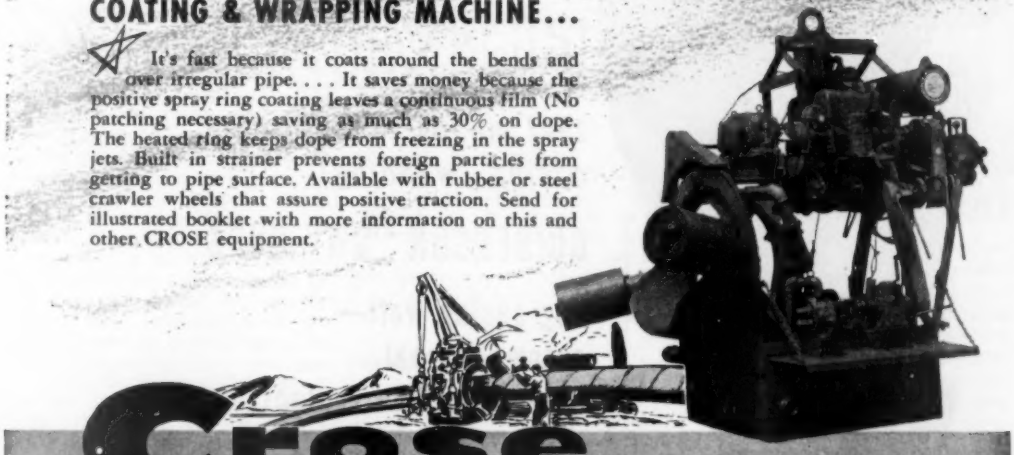

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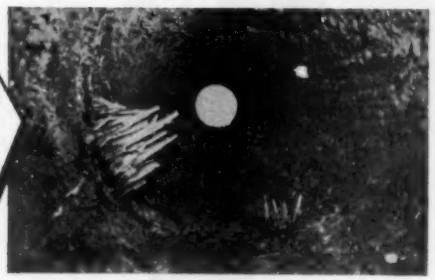

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Pipe Shortage Forces Declines In Drilling

The growing shortage of pipe arising from the prolonged strike in the steel industry is blamed for the sharp curtailment of drilling activity indicated during the week ended June 30, when the number of active rotary rigs in the United States and western Canada dropped to the lowest level since last March.

Active rigs at the close of the above week totaled only 2,850, a decline of 109 from the number reported the previous week. However, there still were 137 more rigs running than at the same corresponding time a year ago.

Sharpest declines in drilling were in the Gulf Coast and the West Texas areas. The Gulf Coast area lost 53 active rigs while there was a drop of 25 rigs in the West Texas district. Marginal increases in activity were noted in the Kansas, Illinois-Eastern, and western Canada areas.

ACTIVE ROTARY RIGS*
(United States and Western Canada)

Area—	Week ended 6-30-52	Change week ended 6-23-52	Change week ended 7-2-51
Gulf Coast	561	— 53	— 29
N. & W. Tex.-N. M.	918	— 25	+ 14
Ark.-N. La.-E. Tex.	144	— 16	— 14
Oklahoma	311	— 15	+ 11
Kansas-S. Nebraska	168	+ 8	+ 10
Illinois-Eastern	173	+ 1	+ 25
Rocky Mountains	235	— 9	+ 77
Pacific Coast	163	— 5	+ 7
Total U. S.	2,673	—114	+101
Western Canada	177	+ 5	+ 36
Total	2,850	—109	+137

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States and the Gulf Coast and Arkansas-North Louisiana-East Texas areas are shown on pages 148 and 149.

Fleet Drilling Co., Ada, Okla., has a rig working for Theodore Briskin, also of Ada, at 1 Ted, a new wildcat operation located in the NW NW NE 36-15n-5e, a mile east of production at the north end of the Davenport field, Lincoln County, Oklahoma. Hole is scheduled for a Wilcox test at 4,500 ft.

Tilley Drilling Co., Wewoka, Okla., is starting a projected 5,100-ft. Wilcox test at a wildcat location 2 miles southeast of Sparks, Lincoln County. It is a contract job for Jon Carson of Oklahoma City. Location is for 1 Neighbors, in the SW SE NE 29-13n-5e. It is a mile southeast of the South Sparks field.

Schmidt Joins King

Carl B. King Drilling Co. of Texas, Midland, Tex., has announced the appointment of R. C. Schmidt as its contract representative. Schmidt formerly was associated with Loffland Brothers Co., Tulsa, as its contract representative in the West Texas-New Mexico district.

New Illinois Drillers

Morrison & Hall Drilling Co. is a newly formed contracting and operating company in the Illinois-Indiana-Western Kentucky region. Owners are Russell Morrison and J. M. Hall, who will have their offices at Albion, Ill. The company is starting with one rotary and one cable tool rig.

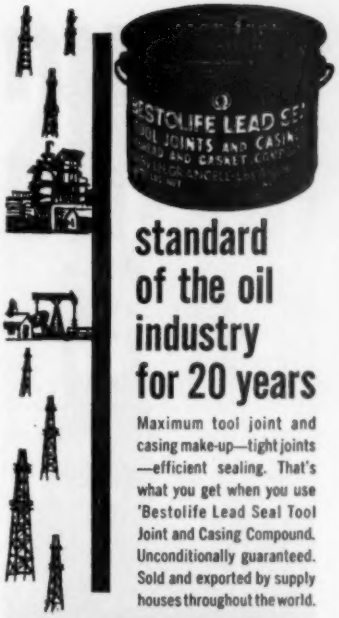
Nuckolls - Bell Drilling Co., Oklahoma City, has a contract with Cameron Oil Co. and others for a 5,800-ft. Wilcox sand test, located on the operators' Rowe lease, in the NW NW SE 4-16n-1w, 5 miles east of Guthrie, Logan County, Oklahoma.

Brinkerhoff Drilling Co., Casper, Wyo., has a new wildcat operation under way for Stanolind Oil & Gas Co. in the Mayworth area of Johnson County, Wyoming. It is 1 Brock, with location in the S½ 24-45n-83w.

Altus Drilling Co., Oklahoma City, is drilling for C. E. McCaughey and associates at 1 Holmes, an outpost test south of the Yaeger field, Hughes County, Oklahoma. Location is in the SW NW SE 19-8n-10e. Objective is the Cromwell sand, expected around 3,600 ft.

Olds Oil Corp., Casper, Wyo., is drilling on a new contract with James P. Sloss at 1 Roeder, a wildcat located southeast of Cornish in central Weld County, Colorado. Location is in the SW SW SW 5-6n-6w.

Folk Drilling Co., Yukon, Okla., has a rotary rig working on a contract with N. V. Duncan at a location, 1 Haws, east of the Masham field, Pawnee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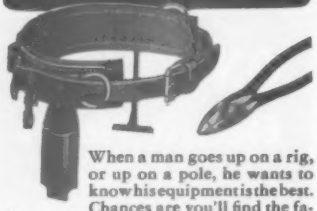

When a man goes up on a rig, or up on a pole, he wants to know his equipment is the best. Chances are you'll find the familiar Klein trade-mark on his safety strap and belt. And in his kit you'll find Klein pliers, lag wrenches and grips. For Klein is the quality line—the line a man can always depend on for safety and service.

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County, Oklahoma. Location is in the NW SW NW 26-23n-4e. Hole is projected to 3,350 ft.

J. I. Roberts Drilling Co., Shreveport, is starting another well for Murphy Corp. of El Dorado, Ark., in the Sinsboro field, Lincoln Parish, Louisiana. It is 2 Sherrard, a 6,600-ft. Gardner sand test, located in 3-17n-4w.

Ike Taylor, Lewiston, Mont., has a new wildcat operation under way in the Brush Creek area, Petroleum County, Montana, where he is drilling on a contract with Catlett-Frary-Taylor at 1 Whittier. Location is in the NE SW NW 27-16n-27e.

Hewit & Gullick Drilling Co., Casper, Wyo., is the contractor on Shell Oil Co.'s new deep wildcat test being started in the Longrass area, Richland County, Montana. The test, contracted to 10,600 ft., is the operator's 22-29 Etzel. Location is in the SW SE NW 29-26n-51e.

Penrod Drilling Co., Shreveport, La., has a new wildcat operation under way for Hunt Oil Co. in Webster Parish, northern Louisiana. It is a Pettit lime test, 1 Sims, contracted to 6,150 ft. Location is in 5 23n-9w, a little more than 2 miles east of the North Shongaloo field.

Baker & Taylor Drilling Co., Amarillo, Tex., has contract for Lewis W. Welch 1 Joseph Espy, a 14,000-ft. test in 110-4-H&TC, approximately 22 miles west of Marfa in Presidio County, southwestern Texas.

Deckard Drilling Co. is the contractor on a wildcat test which E. P. Thomas and associates are starting just east of Yazoo City, in Yazoo County, Mississippi. Location is in the C NE SE 34-12n-2w, on the Yazoo County poor farm, a Carter Oil Co. farmout. Contract is for 6,250 ft.

Circle Drilling Co., Lake Charles, La., is drilling on two more coastal Louisiana wildcat tests. One is a 9,000-ft. contract for Rycade Oil Corp. at 1 Ribbeck, in 30-8s-8w, 1½ miles southwest of Belfield, Calcasieu Parish. The other is an 8,500-ft. test being drilled for Vincent & Welch, Inc., at 1 Newport, in 30-5s-11w, Pine Grove area, 6 miles southwest of Juanita, Beauregard Parish.

Arrow Drilling Co., Dallas, is one contractor, and **Norwood Drilling Co.,** Wichita Falls, Tex., the other, on two rank wildcat tests which Deep Rock Oil Corp. is drilling in Beaver County, in the Oklahoma Panhandle. The Arrow job is 1-A Shadden, C NE NW 25-3n-24eCM, 10 miles southeast of Beaver. The Norwood job is 1-A Adams, C NE NW 22-6n-25eCM, 5½ miles northeast of Mocane, near the Kansas line.

Gabbert & Jones Drilling Co., Wichita, Kans., has a rig working in the city limits of South Haven, in Sumner County, Kansas, where it is drilling for Time Petroleum Co. The test, 1 South Haven, is a wildcat, located 2 miles west of production of the Guelph pool. Location is in the SE NE SW 35-34-1.

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PRESSURE SPRAYING hot crude oil on 20-foot dike at a Pacific Coast refinery is accomplished with positive pressure through the 4-way valve on a Thompson Unitized Vacuum Tank truck. Right: This waste crude oil unloaded into sump under gravity flow in minutes flat. The Thompson Unitized Vacuum Tank has been acclaimed the "handiest tool." See list below.

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- ☐ Clean Tanks
- ☐ Clean Drain Boxes
- ☐ Unplug Drain Lines
- ☐ Clean Cooling Tower Basins
- ☐ Clean Separator Boxes

Production
- ☐ Drain Sumps
- ☐ Clean Tanks
- ☐ Pump Out Cellars
- ☐ Oil Roads
- ☐ Spray Weeds

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- ☐ Clean Excavations
- ☐ Clean Spills, Leaks
- ☐ Puddle Trenches
- ☐ Unplug Lines
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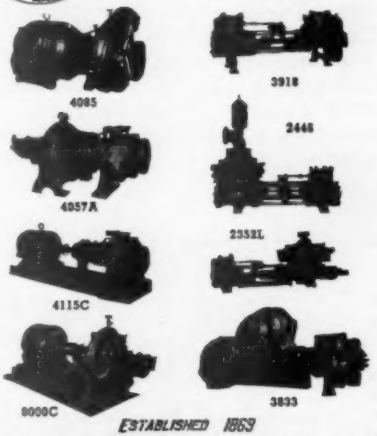

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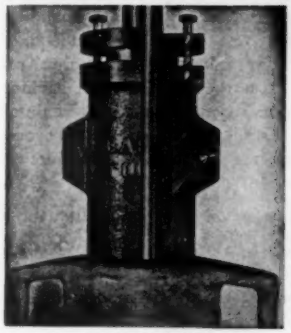

...for wells that head up and flow. Lubricator is packed with shredded graphite, and rests on top of any stuffing box.

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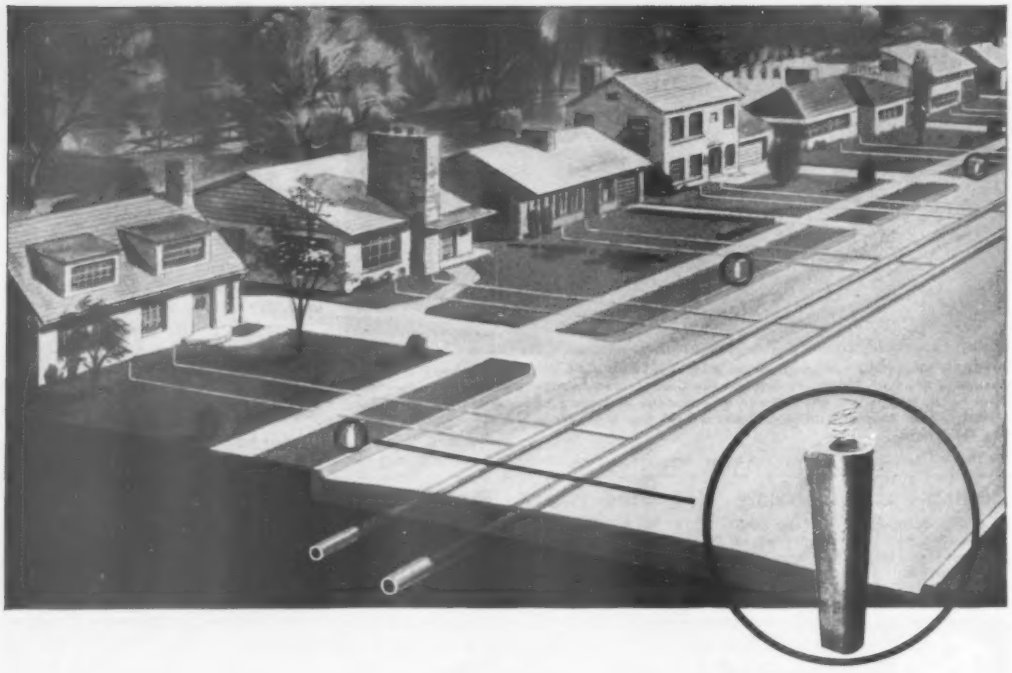

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PIPE LINES

Expansion O.K.'d

El Paso's $108,680,164 program gets green light

WASHINGTON.—El Paso Natural Gas Co. has the green light to build facilities which will provide additional natural gas to customers in New Mexico, Arizona, and California, and supply a new wholesale customer which will serve markets in Nevada.

The Federal Power Commission has approved the company's estimated $108,680,164 expansion program which calls for:

1. Increasing deliveries to Pacific Gas & Electric Co., San Francisco, by 150,000,000 cu. ft. of gas daily.

2. Adding 150,000,000 cu. ft. of gas daily to Southern California Gas Co. and Southern Counties Gas Co. of California's supplies.

3. Providing up to 20,000,000 cu. ft. of gas daily to Nevada Natural Gas Pipe Line Co., Las Vegas.

4. Supplying gas on an interruptible basis to Gallup, N. M., for use in a municipally owned electric-power generating plant.

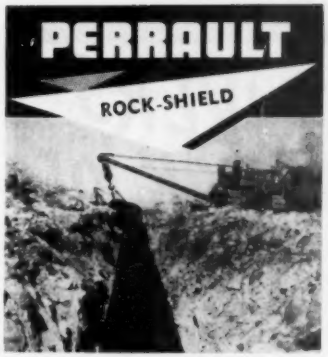
Ramifications . . . The El Paso approval also affect the other companies. FPC authorized the three companies mentioned to construct facilities to transport the gas they will get from El Paso, and authorized San Diego Gas & Electric Co. to build a new compressor station. It denied a request by the company for an allocation of gas from Southern Counties.

Condition removed . . . The commission removed the condition, included in a certificate issued to El Paso in July 1950, limiting the company's deliveries through its San Juan pipe line to not more than 34 billion cubic feet annually.

FPC said that since then additional gas reserves have been developed in the San Juan basin, and El Paso has acquired commitments for sufficient re-

Ticklish Narrows Crossing Completed

Raymond Crowe, chief engineer for Transcontinental Gas Pipe Line Corp., signals arrival of the Brooklyn end of the 6,600-ft. crossing. (The Oil and Gas Journal, June 30, page 46.) Completion of the link across the Narrows of New York Harbor from Staten Island assures the New York area of a second inlet for the 250,000,000 cu. ft. of gas it receives daily from Texas fields. The crossing is reported to be the deepest (about 100 ft.) of any pipe-line river crossing in the country.



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serves from that area so as to make it reasonable to remove the annual limitation, as well as to authorize the construction of facilities to increase capacity of its pipe line from the basin.

What will be built . . . El Paso will build 170 miles of main-line loop and a total of 153,000 hp. in main-line and booster compressor stations.

P. G. & E. will build 86 miles of loops and 19,540 hp. additional on its existing line from a point near Topock, Ariz., to Milpitas, Calif., to increase capacity by 150,000,000 cu. ft. daily.

The two southern California companies will build 20 miles of loops and 13,500 additional horsepower in compressor units on existing lines.

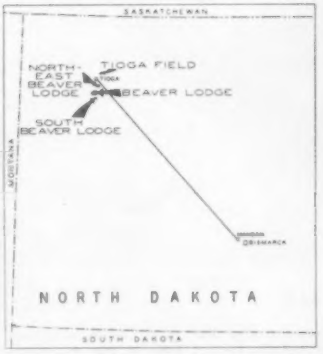
The San Diego firm will build a new compressor station at Rainbow, Calif., to provide 10,000,000 cu. ft. of storage capacity along its Rainbow-San Diego line.

AEC provision . . . FPC's order approves a stipulation between El Paso and the Atomic Energy Commission reserving to AEC in marketable quantities for the period ending June 30, 1957, a total of 150 billion cubic feet of gas in San Juan basin.

Service Plans Crude Outlet From Tioga to Mandan, N. D.

TULSA.—Service Pipe Line Co. has announced plans to build 170-mile, 12-in. pipe line outlet for crude produced in the Beaver Lodge area of the Williston basin in North Dakota.

J. L. Burke, Service president, said the line will be built in 1953 or 1954. It will extend from near Tioga to serve a new refinery planned by Standard Oil Co. (Ind.) in the Mandan-Bismarck area *(The Oil and Gas Journal, June 30, page 43)*.



NEW CRUDE LINE planned by Service Pipe Line Co. probably will follow this general route from near Tioga to a projected new refinery near Mandan.

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At the Tioga end, the line would connect with gathering system of Beaver Lodge and other newly discovered fields in the area.

The route of the line and the location of a pump station will be influenced by future development of the basin fields, Burke said.

Initial capacity is planned at 15,000 bbl. daily, which also is the initial capacity planned for Standard's refinery near Mandan.

The first crude line in the Williston basin was laid by Service last winter. It connects producing wells in Beaver Lodge field with a railroad tank car loading rack at Tioga. This line now has been expanded from the original 14 miles to 20 miles.

Lone Star Hooking Up Donie Field, Laying Other Lines

DALLAS.—Lone Star Gas Co. has construction under way on a pipe line which will deliver gas into its system from the new Donie field in south Freestone County, East Texas, and a line to increase present facilities supplying Waco and points south.

Luther Tolbert, superintendent of pipe lines, said the over-all project was scheduled for completion by the middle of July at a cost of around $750,000.

First phase of the work calls for the laying of 17 miles of 16-in. pipe, starting at Lone Star's compressor station north of Groesbeck in Limestone County and extending east to a point south of Teague in Freestone County. This section will replace 12-in. pipe in Lone Star's dual system of 12-in. and 20-in. pipe extending 70 miles east from Waco and terminating near Dew in Freestone County. At that point the dual lines revert to a single 12-in. line connected to gas fields in Anderson County.

From the east end of the new 17-mile replacement line, Lone Star will drop south with 3 miles of 12-in. pipe to make connection with reserves in Donie field. At present the company has access to more than 5,000,000 cu. ft. of gas daily from Donie field, and the supply will be stepped up with the drilling of additional wells in the field.

Third phase of the construction program calls for the laying of 10 miles of 12-in. pipe from Lone Star's compressor station at Waco to Riesel in McLennan County.

Mexia is headquarters for the construction project, which is under the supervision of Vaughn Sears, Lone Star construction foreman. Company crews have been assigned the work.

See Composite and Refinery Catalogs, or Write for Folder on

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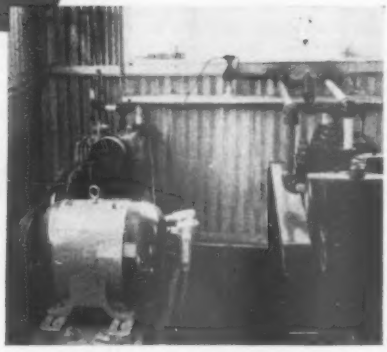
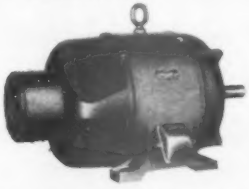
Century Motors are available in a complete range of types, in sizes from 1/8 to 400 horsepower. For complete information, see your nearest supply store—or Century branch office.

Century C MOTORS



Century 5 horsepower capacitor type Explosion Proof Motor on an air compressor in a gas repressuring plant.



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REFINING

Suntide Under Way

Preliminary work pushed on Corpus Christi plant

CORPUS CHRISTI.—Surveying, site-leveling, and foundation work is under way at a 134-acre site 6 miles northwest of here for Suntide Refining Co.'s new 25,000-bbl. refinery.

The new plant will represent an investment of more than $15,000,000. It is expected to be completed and in operation by late 1953, according to Floyd Martin, president of the new company. Detailed information released by Martin reveals that:

. . . **Facilities** will be designed to manufacture high-octane gasoline with a minimum of residual fuel oil. They will include 9,000-bbl. daily of fluid catalytic cracking capacity, catalytic polymerization, alkylation, and blending units, and auxiliary facilities. Construction contract has been let to Lummus Co.

. . . **Construction costs** will be in part underwritten by a public sale of 10-year subordinate sinking-fund debentures and 700,000 shares of common stock. This offering will amount to a total of about $17,500,000.

Suntide was formed in May of this year by Sunray Oil Corp. and certain outside banking interests to complete construction (begun by Sunray early this year) and operate the refinery. Sunray holds one-half of Suntide's common stock, subject to an escrow agreement.

. . . **Crude supply** will be obtained principally from Sunray under a 10-year contract. The refinery will be operated in conjunction with Sunray's deep-water, crude-oil terminal and storage-tank facilities in the Corpus area, and with Sunray Coastal Pipe Line Co.'s crude pipe-line-gathering system from Keeran field in Victoria County, Texas, to Corpus Christi.

On completion of the refinery Suntide plans to ship products by tanker to the East Coast and by barge, rail, and pipe line to nearer markets.

Shell Gets Permit for New Refinery Smoke Eliminator

WILMINGTON, Calif. — Shell Oil Co. has been given an operating permit from the Los Angeles County Air Pollution Control District for a new $72,000 smoke eliminator at its refinery here.

The flare dispels smoke from the emergency burning of waste gases at the plant. During plant shutdowns or other emergencies in the refining process, gases which normally are handled in a closed circuit accumulate so rapidly that they must be automatically switched to a remote control flare and burned.

The new flare is 40 ft. high and 20 in. in diameter. It mixes steam with the gases which then are ignited by a per-

NELSON REFINERY CONSTRUCTION INDEX

Appears in the first issue of each month.
Explanation—Cost-imating No. 61, December 15, 1949, pages 91, 92.
Compiled by W. L. Nelson, Petroleum Refinery Consultant, Tulsa.
Indexes of Individual Equipment Items—January, April, July, and October.

INDEX (1946 = 100)

	1948	1949	1950	1951	March 1952
Centrifugal pumps	120.0	118.9	128.1	136.2	136.2
Reciprocating pumps	138.1	144.6	143.9	182.4	183.3
Compressor	128.0	120.0	118.8	138.1	138.1
Engines	120.0	115.5	117.9	137.1	137.1
Motors	112.7	114.0	130.8	148.8	148.8
Transformers	116.0	116.0	116.0	130.5	130.5
Instruments	120.0	120.0	127.8	142.3	142.4
Miscellaneous equipment ave.	122.1	121.6	126.2	145.1	145.2
Materials component	139.3	143.6	149.5	164.0	161.6
Labor component	128.0	137.1	144.0	152.5	157.5
Refinery construction index	132.5	139.7	146.2	157.2	159.1

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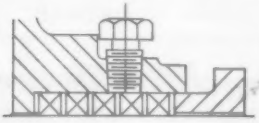

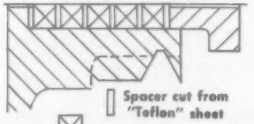

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manent pilot jet. The steam forms compounds which burn more completely and at lower temperatures, thus minimizing formation of carbon or smoke particles and reduces the size and color of the flame so it is almost invisible.

Taylor Refining Succeeded By Taylor Oil & Gas Co.

TAYLOR, Tex.—Taylor Oil & Gas Co., a Delaware corporation, last week succeeded Taylor Refining Co. No changes in management or in properties are involved in adopting the new corporate name. Headquarters of the new company will remain at Taylor.

The new company will operate a 47,000-bbl. refinery at Corpus Christi and a number of producing properties. With Mayfair Minerals, Inc., it is the joint owner and the operator of McAllen gas field, including a 200,000-gal. cycling plant. The two companies also are joint owners of a 10,000-bbl. refinery at Port Isabel, Tex., which is operated by Taylor.

Production of Perfect Lubes Using Fluorocarbons Seen

NEW YORK. — The possibility of producing lubricants with perfect properties from fluorocarbons was visualized last week by representatives of M. W. Kellogg Co., in its announcement of a new $1,000,000 plant for the production of KEL-F.

So far production of oils with reduced tendency to oxidize, low vapor pressure, high degree of oiliness and high viscosity index has not yet been fully realized.

Kellogg, however, says that it has achieved two, and possibly three, of these perfect properties, but have not yet been able to meet the high viscosity-index objective.

Cities Service Completing Product-Storage Facilities

NEW YORK.—Cities Service Oil Co. is nearing completion of construction of 856,000 bbl. of product-storage facilities.

This includes 435,000 bbl. of new storage at Linden, N. J., 96,000 bbl. at Petty's Island, N. J., and 325,000 bbl. at Lakes Charles, La.

Still more storage is planned, including 520,000 bbl. at Linden, 260,000 bbl. at Petty's Island, and 600,000 bbl. at Lake Charles. When these facilities are completed the company's product-storage capacity will be increased by 1,380,000 bbl.

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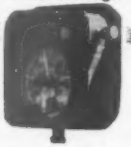

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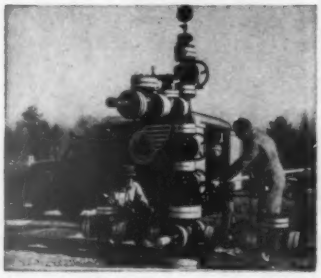

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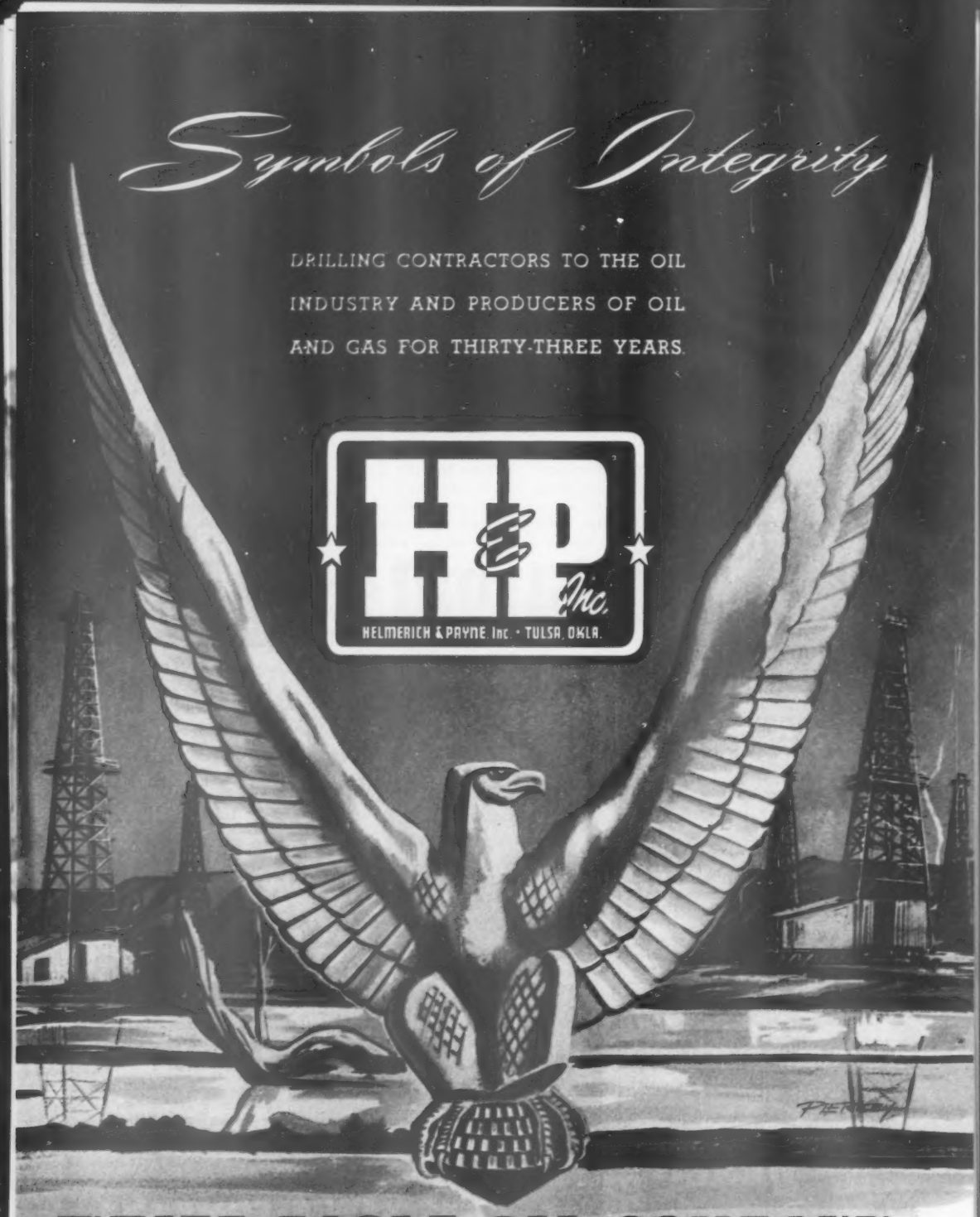
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Oklahoma's Busy Beaver County

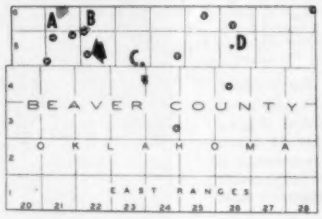
BEAVER County is experiencing a rapid buildup toward what may develop into the most feverish wildcatting program that Oklahoma has seen in many years.

With 11 active wildcats, all-but-productionless Beaver County is at the top of a list of this country's counties having the greatest number of truly rank wildcats. Beaver County's 10 rank wildcats and 1 deeper-pool test (big dots on sketch map) are in an area which does not yield its subsurface structural picture to surface geological or core-drill studies nor to detailed geophysical methods. These wildcats are in an area where locations are based on stratigraphic trend ideas and where there are few wells to hint of the locations of porosity traps.

Just 6 months ago, Beaver County had only one producing area, a four-well gas-distillate field that was shut in. The county now has two oil discoveries, an indicated oil discovery, and a gas discovery to the south and east of the lone field.

The indicated oil discovery is Carter Oil Co. 1 Dorman, arrowed on map. This wildcat, a little more than 4 miles south of the recently discovered Greenough pool, B on map, flowed a steady stream of 39°-gravity oil for about 53 minutes on a 70-minute drill-stem test. The test was made at 5,595-5,600 ft., probably in the Pennsylvanian-Marmaton. A previous drill-stem test, at 5,583-95 ft., recovered 2,400 ft. of clean 39°-gravity oil and 270 ft. of salty, oil-cut mud and salt water. Farther up the hole, in the Lansing-Kansas City at 5,263-79 ft., a 2-hour drill-stem test recovered 3,150 ft. of gas, 100 ft. of 39°-gravity oil, and 10 ft. of heavily oil-cut mud.

The 1 Dorman has indicated the third discovery in Beaver County during 1952. The first completed oil well in the county was Flynn Oil Co. 1 School Land, C on Map, which stimulated a revival of interest in the possibilities of finding adequate porosity development in pre-Permian rocks in this northwestern portion of the Anadarko



basin. This once-exciting discovery has been offset to the east and to the south by dry holes since it was originally completed on pump for about 10 bbl. per hour from the Marmaton at 5,540-49 ft. The well is currently pumping about 65 bbl. of oil and 130 bbl. of water daily from the Lansing-Kansas City at 4,768-70 ft.

The second completion was Emby Kaye (now Carter Oil) 1 Sharp, which opened Greenough pool, B on map. This discovery was completed flowing 156 bbl. of 40°-gravity oil in 4 hours through a 33/64-in. choke with 1,845 M.c.f. of gas daily from the Pennsylvanian-Cherokee at 5,833-49 ft. There are now two offsets to the discovery being drilled. Carter 1 Breen, east offset, has yet to reach the Cherokee pay; but Carter 1 Grove, south offset, has drilled through the pay zone without finding commercial production and is now a deeper-pool wildcat.

The third discovery to be completed in Beaver County was Pure Oil Co. 1 Albert, D on map, which was completed for a 2-M.M.c.f. gas well.

Beaver County's first producing well was the discovery well of Light-Liberal pool, A on map. The discovery well, H. L. Hunt 1 Light Ranch, was completed in 1947 as a gas-distillate well. This discovery stood alone until March 1951 when J. M. Huber Corp. completed a southeast extension well and about the same time completed a 28-bbl. per hour oil well just across the line in Seward County, Kansas. Four more gas-distillate wells have been completed in the Beaver County portion of this two-state field since that time. Wells are completed from the Mississippian and basal Pennsylvanian-Morrow for a choked flow of from 5 to 10 M.M.c.f. of gas daily with 4 to 12 bbl. of distillate per M.M.c.f. of gas.

The possibility of finding tremendous oil reserves in the general Beaver County area of the Anadarko basin appears more and more promising. Once a sufficient number of wildcat tests have been drilled to provide control for some actual subsurface studies in this area, activity can be expected to really begin popping. *Philip C. Ingalls.*

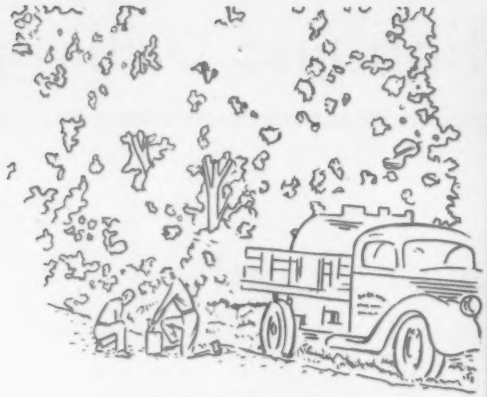
HIGHLIGHTS OF WEEK'S DEVELOPMENTS

MICHIGAN . . . A big Salina gas well was being tested in Casco Township, St. Clair County, at Panhandle Eastern Pipe Line Co. 1 Ringel. The well flowed approximately 15,000 M.c.f. of gas per day after acid treatment.

MONTANA . . . The Texas Co. has an apparent discovery between Sumatra and Ragged Point fields in Rosebud County. The wildcat flowed oil after 42 minutes of drill-stem test in a formation tentatively identified as the Big Snowy group.

UTAH . . . Carter Oil Co. recovered 8,610 ft. of oil on 2-hour drill-stem test of the zone 9,225-80 ft. at 3 Ute-Tribal, extension south of Roosevelt pool in Uintah County.

WEST TEXAS . . . Flush Ellenburger production was in prospect for southeast Winkler County, between Wheeler and North Monahans fields at Stanolind Oil & Gas Co. 1-B Wight.



JAMES D. CRARY, *now a Party Chief, had his B.S. degree from St. Lawrence University when he started digging shot holes for Independent 16 years ago. Such a record of experience is characteristic of the men responsible for the success of Independent's field work.*

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EXPLORATION COMPANY

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North-Central Texas

Conglomerate Strike Seen Near Montague

WICHITA FALLS.—Conglomerate production 1 mile northwest of Montague has been indicated by American Production Corp. 1 Fenoglio. Drill-stem test at 6,305-26 ft. had gas in 8 minutes and flowing oil in 35 minutes. Rate of flow was not disclosed, but surface flowing pressure was 2,050 psi. Recovery included some salt water in the bottom of pipe. Operators were drilling ahead at 6,365 ft.

Russell Maguire 1 Whitehead, wildcat northwest of Sunset, developed 90 ft. of oil-cut mud on a 2-hour drill-stem test at 5,811-32 ft., and was drilling ahead below 5,857 ft. Proposed depth was 7,200 ft.

In Knox County, Deep Rock Oil Corp. was drilling ahead at 1 J. C. Hawkins, wildcat east of Knox City, following drill-stem test from 5,538-53 ft. Recovery was 25 ft. of drilling mud.

Dillard & Waltermire were moving in to drill 1 Johnson & Crockett as a 6,400-ft. Clay County wildcat, 3 miles southwest of Buffalo Springs, in the W. A. Ferris Survey, A-147.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: Sid Perryman & Oltex Drilling Co. 1 Powell, J. W. Harris Subd., TD 2,745 ft., pay 2,734 ft., IP pumped 75 bbl. 44°-gravity oil.

O. S. Thorp 1 W. H. Taylor, Sec. 17, ATNCL, TD 90 ft., pay 81 ft., IP pumped 4½ bbl. oil.

Cooke County: W. O. Russell 1 Randall, J. N. Redman Sur., A-874, TD 1,625 ft., pay 1,616 ft., IP pumped 12½ bbl. 38°-gravity oil.

Jack County: Star Oil Co. 2 P. D. Rhodes, W. B. Jacobs Sur., A-2,200, TD 4,637 ft., elev. 1,268 ft., conglomerate gas pay 4,530-46 ft., IP 6,400,000 cu. ft. of gas, TP 1,595 psi.

Nolan County: Rowan & Hope 1 E. H. Harkins, 40-22-T&P, TD 6,906 ft., elev. 2,340 ft., pay 5,787 ft., IP 70 bbl. 44°-gravity oil, ¼-in. choke, TP 175 psi., GOR 860 cu. ft.

Stephens County: W. J. Rhodes 1 Moon Ranch, 21-5-T&P, TD 4,002 ft., elev. 1,224 ft., gas pay 3,820 ft., IP 2,150,000 cu. ft. of gas, open flow.

Throckmorton County: Jones & Stasney 3 M. B. Gentry, Comance Sur. 95, TD 4,750 ft., pay 4,340 ft., IP 126 bbl. 43°-gravity oil, 16/64-in. choke, TP 160 psi., GOR 1,450 cu. ft.

Jones & Stasney 1 Watt R. Matthews, Sec. 74, CIR Sur., TD 4,714 ft., pay 4,384 ft., IP 351 bbl. 43°-gravity oil, 16/64-in. choke, TP 150 psi., GOR 1,275 cu. ft.

G. E. Kadane & Sons 2 Davis Condron Unit, Sec. 295, BBB&C, TD 3,454 ft., pay 3,445 ft., IP pumped 62 bbl. 41°-gravity oil.

Wise County: Tom B. Medders 1 Mrs. M. P. Younger, Falls CSL, A-293, TD 5,915 ft., elev. 986 ft., pay 5,750 ft., IP 192 bbl. 42°-gravity oil, ½-in. choke, TP 140 psi., GOR 385 cu. ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Baylor County: Joe Reznick 1 Mrs. George Longley, Sec. 227, T&NO, dry, TD 3,510 ft.

Callahan County: American Trading & Production Corp. 1 Kendrick, Sec. 42, BBB&C, dry, TD 2,163 ft., elev. 1,988 ft., Gunsite 2,042 ft., Swastika 2,110 ft.

Clay County: Bridwell Oil Co. 1 Sanzenbacher, T. Bates Sur., A-13, dry, TD 6,045 ft.

Frank Wood Associates 1 Viola Myers, M. B. Skerrett Sur., dry, TD 6,701 ft.

Coleman County: L. H. Choate and Bankline Oil Co. 1-18 Ballard, M. E. Williams Sur., dry, TD 3,118 ft., elev. 1,813 ft., Fry sand 2,545 ft., Gardner 2,655 ft.

H. B. Ownby Drilling Co. 1 Dan Smith, Sec. 469, W. M. Miller Sur., dry, TD 4,169 ft.

Union Oil Co. of California 1 Hudson, 73-2-GH&H, dry, TD 3,765 ft.

Cooke County: T. P. Frost 1 H. Y. Gibson, E. A. Clubb Sur., A-279, dry, TD 2,130 ft.

T. P. Frost 1 Gregory, H. Nail Sur. 790, dry, TD 1,650 ft.

Eastland County: George Callihan 1 T. J. Collins, 11-1-H&TC, dry, TD 3,505 ft., elev. 1,444 ft., Marble Falls 2,872 ft., Ellenburger 3,390 ft.

Victor Cornelius 1 McCarty, 99-3-H&TC, dry, TD 4,004 ft.

Hickok & Reynolds 1 Della Wallace, Sec. 13, BBB&C, dry, TD 3,873 ft.

Haskell County: W. H. Bryant 1-B Ada Couch, Sec. 76, J. Williams Sur., dry, 3,036 ft.

Pure Oil Co. 1 A. R. Hannz, Chas. Irwin Sur., dry, TD 3,250 ft., elev. 1,538 ft., Gunsite 2,345 ft., Swastika 2,600 ft., reef 3,132 ft.

French M. Robertson 1 Mrs. J. F. Jones, Sec. 8, Coryell CSL Sur. 72, dry, TD 5,837 ft., elev. 1,662 ft., Caddo 5,585 ft., Bend 5,805 ft., Mississippian 5,804 ft.

Vega Corp. 1 Floyd McArthur, Lot 76, I. Ramos Sur. 109, dry, TD 4,696 ft., elev. 1,515 ft., Palo Pinto 3,614 ft.

Jack County: Weber & Kurtz 1 J. H. Shawn, Jesse E. Irvine Sur., dry, TD 330 ft.

Jones County: Great Lakes Carbon Co. 1 Knox Pittard, 4-1-T&NO, dry, TD 2,494 ft.

James R. Nowery 1 Clyde H. Jones, 16-15-T&P, dry, TD 2,297 ft., elev. 1,733 ft., Flippen 2,295 ft.

Montague County: George S. Engle 1 S. J. Brown, J. Rippentoe Sur., A-853, dry, TD 7,305 ft., elev. 1,039 ft., Caddo 6,690 ft.

Shackelford County: Bridwell Oil Co. 2 Henry Lieb, A. Leib Sur., dry, TD 2,050 ft.

Stonewall County: Murchison Bros. 1 M. Alexander, 2-F-H&TC, dry, TD 6,111 ft., elev. 1,593 ft., reef 5,452 ft., Mississippian 5,810 ft., Ellenburger 6,040 ft.

Woodward Oil Co. 1 Cleo W. Smith, A. C. George Sur., dry, TD 5,982 ft.

Taylor County: Yucca Drilling Co. 1 Alvis Parker, John McSherry Sur. 129, dry, TD 3,600 ft., elev. 1,846 ft., Cook sand 2,440 ft.

Throckmorton County: D. E. Hughes 1 Mrs. Carrie Gray, Sec. 2,33, TE&L, dry, TD 4,690 ft., elev. 1,224 ft., Caddo 3,776 ft.

Panhandle Oil & Gas Corp. 1 Travis Co. Fee, Sec. 54, A-254, dry, TD 5,125 ft., elev. 1,300 ft., Mississippian 4,995 ft.

Wilbarger County: Ted Norwood 1-H Waggonner, 7-4-H&TC, dry, TD 2,428 ft.

Young County: Carpenter et al 2 Lem Groves, TE&L Sur., dry, TD 1,500 ft.

Giddens & Schriver 1 F. E. Wray, J. M. Hume Sur., dry, TD 4,066 ft.

R. M. McDonnell 1 F. M. Gilmore, Young CSL, A-1,284, dry, TD 3,170 ft.

Warren Oil Corp. 4-K Allar Co., TE&L Sur., 1,653, dry, TD 4,671 ft., elec. 1,186 ft., Caddo 3,636 ft., Mississippian 4,572 ft.

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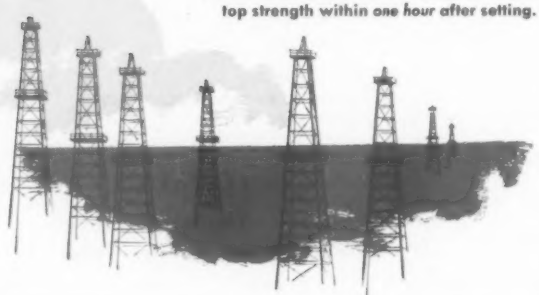

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Rocky Mountain

Discovery Seen For Rosebud County

DENVER.—The Texas Co. has an apparent discovery in Rosebud County, central Montana, where oil flowed after 42 minutes of a 50-minute drill-stem test at 1 Grebe, C NW NW 15-11n-32e, between Sumatra and Ragged Point fields. The test was of the zone 4,714-38 ft. Flowing pressure was 875-1,840 psi., and shut in pressure 1,880 psi. on the test. Recovery in addition to the oil was 120 ft. of drilling mud and 170 ft. of water. Oil was dark brown 34.4° gravity.

Formation tops on the apparent discovery have not been released, but observers believe production is from the Big Snowy group, which produces at both Sumatra and Ragged Point fields. The wildcat is outside the Williston basin area of the state, in a locality where The Texas Co. started a wildcat program about four years ago. In addition to small producers at Sumatra and Ragged Point, production has also been found at Melstone and Big Wall fields, west of the present discovery, in Musselshell County.

Other Montana developments include announcement of a wildcat test of Tensleep in the northwest Frannie area in Carbon County by Mule Creek Oil Co. of Billings. The well is 1 Melcher, C NW SE 30-9s-25e, just north of the Wyoming line. In Beaverhead County, Cities Service Oil Co. has spudded 1 Emrich, W½ NW NE 33-14s-7w in the Lima area, and is drilling below 500 ft. This test is regarded as one of the most important now operating in the state. The most closely watched Williston basin test in the state at the present is Shell Oil Co. 1 Little Beaver, C NE SW 13-4n-61e, in Fallon County on the extreme southern end of the Baker-Glendive anticline. Shell has run and perforated casing between 8,475-8,525 ft. and is preparing to acidize and test.

Amerada Petroleum Corp. has abandoned 1 Odergaard, C NE NE 33-156n-95w, 3½ miles northeast of the Beaver Lodge discovery well, Williams County, with a resultant establishment of limits of production on the east side of the field in both Madison and Devonian formations. Total depth was 12,098 ft. with top of Madison at 8,445 ft. and Devonian 10,128 ft.

WYOMING SUCCESSFUL WILDCATS

Big Horn County, West Greybull: Trigood Oil Co. 1 Government, NW NE SE 27-52n-94w, Greybull 10,330-80 ft., flowed 2,000 M.c.f. of gas per day with 40 bbl. dist. per million cubic feet, TD 12,177 ft.

Fremont County: Brinkerhoff Drilling Co. 1 Gessell, NW SW SW 14-3n-1w (WRM), flowed 26 bbl. of oil per day through 11/64-in. choke, 48° gravity, Muddy discovery, TD 3,915 ft. Muddy 2,850 ft.

COLORADO SUCCESSFUL WILDCATS

Logan County, West Padroni: Sinclair Oil & Gas Co. 2 A. Sindt, NW SE SW 31-10n-52w, swabbed 70 bbl. of oil per day, Dakota discovery, TD 5,112 ft. New pay.

Morgan County, North Brush: S. D. Johnson 1 Conockaert, NE NE NW 6-5n-56w, pumped 60 bbl. of oil per day from "J" sand, TD 5,908 ft. "J" sand 5,833 ft.

COLORADO WILDCAT FAILURES

Logan County: Skiles Oil Corp. 1 Towner, NW NW NW 8-8n-53w, dry, TD 5,097 ft. Morrison 5,094 ft.

British-American Oil Producing Co. 1 Mc-

Kenzie, NE SW SW 32-11n-51w, dry, TD 4,660 ft. "J" sand 4,595 ft.

Northeast Merino: Skiles Oil Corp. 1 County, SW SE SW 13-6n-54w, dry, TD 5,168 ft. Morrison 5,166 ft.

Kiowa County, Eads: Superior Oil Co. 1 State, C SE SE 16-18s-46w, dry, TD 5,588 ft., granite 5,568 ft.

Montrose County, San Miguel: Pure Oil Co. 1 Unit, NW NE SE 24-46n-14w, dry, TD 7,479 ft.

Morgan County: George & Wrather Oil Co. 1 Kjelgaard, NW SW NW 31-4n-56w, dry, TD 5,521 ft. "J" sand 5,315 ft.

Phillips County: J. L. Taylor 1 Hohn, SW SW SW 3-7n-47n, dry, TD 4,294 ft. Morrison 4,245 ft.

Weld County, Westt Nunn Prospect: The California Co. 1 F. Baiamonte, SE NE NW Lot 3 6-7n-66w, dry, TD 7,948 ft. Morrison 7,925 ft.

NORTH DAKOTA WILDCAT FAILURE

McHenry County: H. L. Hunt Oil Co. 1 Peter Lanertz, C NW SE 17-153n-77w, dry, TD 7,211 ft. Winnipeg 7,092 ft.

WESTERN NEBRASKA WILDCAT FAILURES

Banner County: Fred M. Manning, Jr. 1 Faden, C NW NW 17-18n-54w, dry, TD 5,880 ft. Muddy 5,825 ft.

Cheyenne County: Roeser & Pendleton 1 Burns, SW SW SW 7-15n-47w, dry, TD 4,640 ft. Skull Creek 4,623 ft.

San Juan County: The Texas Co. 1-A Navajo-Tribal, C NE SE 34-30n-17w, dry, TD 8,147 ft. Mississippian 7,696 ft.

ARIZONA WILDCAT FAILURE

Coconino County: Sinclair Oil & Gas Co. 1 Santa Fe, C SW NE 35-28n-1w, dry, TD 3,544 ft.

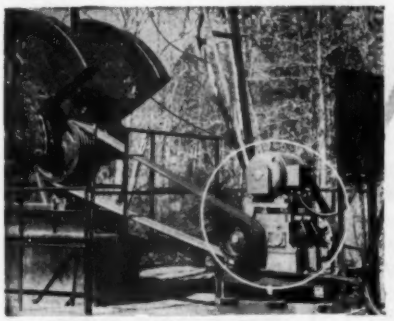
Appalachian-Ohio

West Virginia Wildcat Drilling To Benson Sand

PITTSBURGH.—In Roaring Creek district, Randolph County, West Virginia, Nollem Oil & Gas Corp., Agt. 2 Goff-Arnold Land Co., is drilling in the fifth sand with 20,000 cu. ft. gas at approximately 2,300 ft. This wildcat well will be drilled to the Benson sand. Logan district, Logan County, Hope Natural Gas Co., completed 9720 Boone County Coal Corp., gaging 1,033,000 cu. ft. gas, Berea sand, TD 3,019 ft. Williamsburg district, Greenbrier County, Deep Rock Oil Corp. 1 Bertha H. Thornbury et al, is now drilling at 6,370 ft. Portland district, Preston County, Hope Natural Gas Co. 9670 B. & O. R. R. Co., is drilling at 1,292 ft. and Manufacturers Light & Heat Co. 4116 Enzer and Annie E. Whitehair is shut down at 5,419 ft. for shot. Union district, Hope Natural Gas Co. 9699 D. C. Bishoff, elevation 1,892 ft. is drilling at 4,874 ft. Union district, Pendleton County, Seneca Gas & Oil Co. 1 Neil Harper is shut down at 2,436 ft. Jumping Branch district, Summers County, United Fuel Gas Co. 1-6788 has resumed drilling and is at a depth of 4,675 ft.

Maryland.—In Garrett County, Maryland, Eberly & Snee, completed 3 Eli Beechie, gaging 2,900,000 cu. ft. of gas at a total depth of 4,362 ft. Mid Atlantic Oil & Gas Co. 2 Grimes topped the Oriskany sand at 3,515 ft. with a show of gas at 3,523 ft. and is drilling at this depth.

Pennsylvania.—Unity Township, Westmore-



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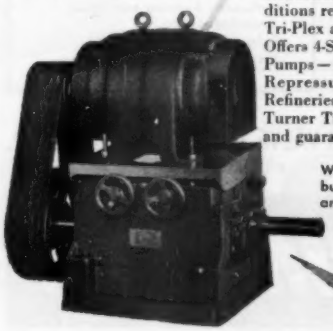
FOR ALL TYPES and SPEEDS of ELECTRIC MOTORS and GAS ENGINES



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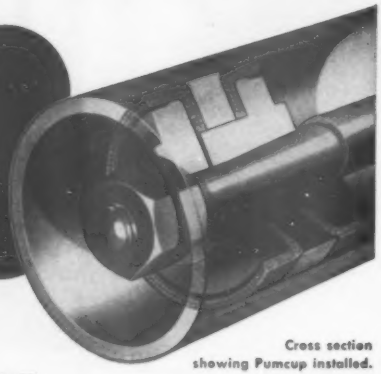

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Automatic bottling and filling machines
Extrusion presses
Steering mechanisms

DARCOVA
THE ORIGINAL COMPOSITION CUP

DARLING VALVE & MANUFACTURING CO.
WILLIAMSPORT 1, PA.

PUMCUPS

land County, Southwest Pennsylvania: Peoples Natural Gas Co. 4003 A. J. Dotterway, is fishing at a depth of 8,220 ft. The Onondaga was reached at 8,270 ft. The depth of the hole is 8,294 ft. The 4008 J. R. Frola is drilling at 2,718 ft.

MARYLAND SUCCESSFUL WILDCAT
Eberly & Snee, 3 Eli Beechie, 290,000 cu. ft. gas, TD 4,362 ft.

Canadian Fields

British Columbia Has Most Promising Discovery

CALGARY.—This week the Fort St. John area came through with the most promising oil discovery so far recorded in that region of northeast British Columbia, a result of the extensive exploratory and development program being carried out after the oil and gas find made late last year near Fort St. John. The new oil discovery was made by Pacific Petroleums and Associates at a 3¾ mile-step out venture, up structure from previous gas wells in the region.

The encouraging British Columbia strike came at Pacific 8 Fort St. John well, on LSD 13, 34-83-19w6, northwest of Nos. 4 and 6 wells. Discovery was recorded in the upper zone of the Triassic, which had proved to be barren at other drillers in the area. Drill-stem test from 4,493-4,503 ft. flowed natural gas at estimated rate 10,000,000 cu. ft. daily and gave up a recovery of 1,380 ft. of light crude oil, with gravity around 40°. Indications are that there was a thin porous zone present in that section, as the bit passed through the pay zone after the one test.

The 8 Fort St. John is the fourth well in British Columbia that has indicated discovery of crude oil, and is that province's most encouraging oil strike to date. This latest venture did not encounter any formation water in the oil structure, while all previous strikes did find water present. Nos. 1 and 4 wells found oil showings in the Permo-Pennsylvanian formation, and No. 7 well gave up oil from the Cadomin sand.

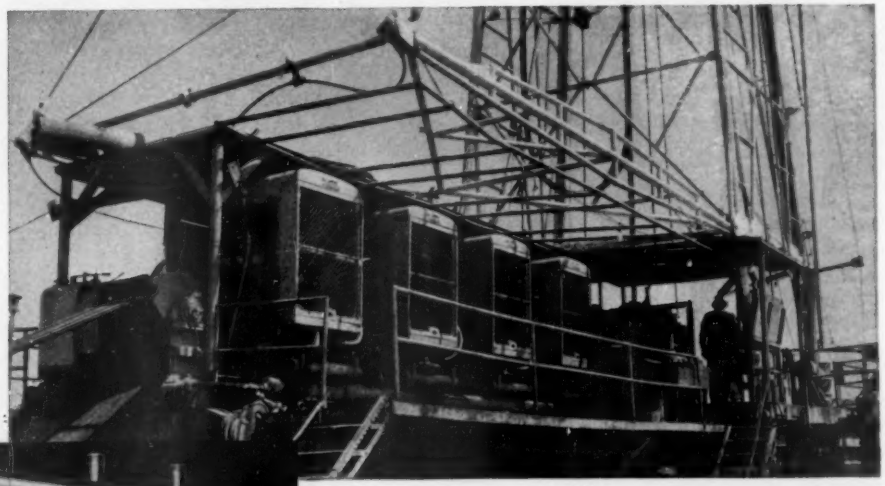
Most wells at Fort St. John have struck natural gas flows from several zones when drilling, and one of the well, 4 Pacific, has found gas in six horizons.

Two Alberta wildcats were chalked up as discoveries this week, including one oil find and a discovery of natural gas. The oil discovery was made in the Rosenheim area of east Alberta, while the gas discovery well was in the Hairy Hill area of central Alberta.

CANADIAN SUCCESSFUL WILDCATS
Wilrich 2 Bonanza, on LSD 6, 13-80-13w6, TD 5,505 ft. Capped potential gas well.
Mitmor-Sturgeon-Modoc 2 Banner, on LSD 14, 27-46-20w4, TD 3,261 ft. oil well.
Texaco Pacific A-1 Dixonville, on LSD 14, 25-86-1w6, TD 6,665 ft. Potential gas well.
Western 13-11 Hairy Hill, on LSD 11, 13-55-14w4, TD 1,930 ft. Potential gas well.
Placid 1 Lake St. Anne, on LSD 16, 16-55-2w5, TD 6,355 ft. oil well.
Long Island 4 Homestead Gas Exploration, on LSD 10, 16-57-25w4, TD 3,769 ft. oil well.

CANADIAN WILDCAT FAILURES
Trans Empire 1 Campbell, on LSD 14, 16-54-25w4, TD 3,787 ft.
Prado 5-12 Chauvin No., on LSD 5, 12-44-1w4, TD 2,193 ft.

this rig has drilled 195,500 FEET...



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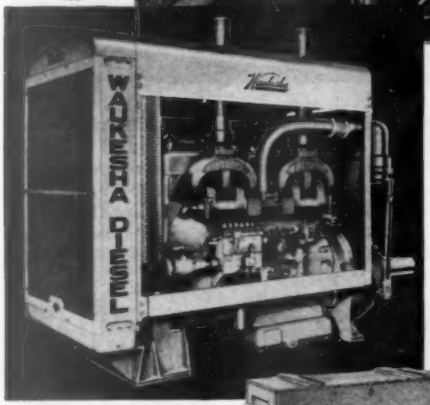

6-WAKD WAUKESHA Diesel Unit, 6-cylinders, 6¼-in. x 6½-in., 1197 cu. in. displacement.

•

WAKD Conversion Kits contain special cylinder heads for gas fuel, top cylinder oilers, a complete gas fuel system, complete ignition system, and accessories. Write for details.

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Mr. David Crow of the Crow Drilling Co., Shreveport, La., had his No. 16 drilling rig, a Model N-10 *Brewster,* built to his special specifications which particularly call for Waukesha Power. It has four Waukesha 6-WAKDG Diesel-Gas Conversion Oil Field Power Units. They also drive the two *Oilwell* No. 214-P mud pumps. Already Mr. Crow has drilled 23 wells, varying from 7000 to 10,000 ft., with this rig—a total footage of 195,500 ft. It is now making hole in Louisiana, across the river from Orange, Texas. The basic features contributing to the rugged, long life of Waukesha Diesels are unchanged, but the conversions are true gas engines.

WAUKESHA MOTOR COMPANY, WAUKESHA, WIS., NEW YORK • TULSA • LOS ANGELES

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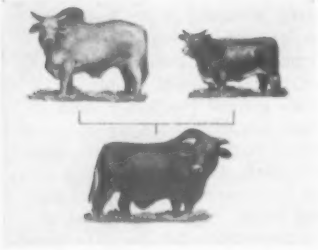

2. **Specifically developed** for Southwest range conditions, this breed "outperforms" others under toughest conditions. The same is true of Conoco Super Motor Oil. This lubricant "outperforms" ordinary motor oils under any driving conditions, for it was developed to protect engines under extremes of temperatures and speed.

3. **50,000 Miles—No Wear!** After a punishing 50,000-mile road test, *with proper drains and regular care,* engines lubricated with Conoco Super Motor Oil showed *no wear of any consequence:* in fact, an average of less than one one-thousandth inch on cylinders and crankshafts. Gasoline mileage for the *last* 5,000 miles was actually 99.77% as good as for the *first* 5,000. Proof that Conoco Super, with OIL-PLATING, *can* help keep engines new!

Now in its 77th year, Continental Oil Company is a leader in oil research and a pioneer in oil-perfecting additives with more than 100 patents on discoveries that improve performance and lengthen the life of your car.

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Red Creek 1, on LSD 3, 26-1-15w5, TD 2,591 ft.

Greenwich 1 St. Paul, on LSD 1, 15-59-9w4, TD 1,564 ft.

Van Tor 1 Tilley, on LSD 7, 14-15-13w5, TD 3,150 ft.

Oklahoma

Beaver County Wildcat Tests Deeper Pay Zone

ADDITIONAL productive potentialities have been uncovered by Carter Oil Co. at its Dorman wildcat, located in the C NW NW 29-5n-22eCM, 3 miles south of Floris, and 4 miles south of the same operator's recently opened Greenough field, in northwestern Beaver County, in the Panhandle.

Having passed up promising oil and gas showings encountered in a lime zone at 5,263-76 ft., from which, in a previously reported drill-stem test, the operator got 3,150 ft. of gas, 100 ft. of 38.5°-gravity oil, and 10 ft. of heavily oil-cut mud, it cored what appears to be a possible more prolific zone at 5,583-5,600 ft.

Two drill-stem tests have been made in the lower zone. The first, with bottom at 5,595 ft., and open 25 minutes, got gas in 7 minutes and oil in 23 minutes. Recovery was 2,430 ft. of 38.9°-gravity oil, 150 ft. of salty oil-cut mud, and 120 ft. of salt water. Flowing pressure gaged 1,510 psi. The second test, with hole deepened to 5,600 ft. and taking in the bottom 5 ft., got 1,620 ft. of clean oil and 810 ft. of salt water. Tester was open 70 minutes. Flowing pressure was 1,755 psi. Hole is being cored ahead.

Discovery of another Wilcox sand pool in Logan County is indicated by drill-stem tests which Sam Trant and John Kraker have made in their 1 Brown, NE SE NW 26-17n-1e. Location is a quarter mile west of an abandoned Layton sand wildcat producer drilled by Gulf Oil Corp. in 1947. Nearest present production is in the West Central School field, 1½ miles to the west. The Trant and Kraker well logged the top of the first Wilcox at 5,023 ft. A test, with bottom 3 ft. in the pay and taking in an interval below 5,012 ft., flowed gas with a spray of oil after 7 minutes and recovered 310 ft. of free oil and 150 ft. of oil-cut mud (90 per cent oil) in the breakdown. Hole has been deepened to the second Wilcox sand where another test is under way.

Another oil discovery is being chalked up for active Lincoln County where William A. Norton and Beverly Edwards recovered 682 ft. of free oil and 90 ft. of oil-cut mud from Prue sand at their 1 Willis, NW NW NW 8-14n-4e. Prue sand was cut from 3,858 ft. to 3,878 ft. (total depth). The test, open 2 hours, got a gas flow in 10 minutes and "kicked" oil during the breakdown. The location is ½ mile west of a newly developed Oswego lime producing area 1½ miles west of Chandler. The area is ¾ mile north of the Chandler field proper but is separated from that production by dry holes.

Jones-Shelburne and associates 1 Maloy, NW SE SE 3-13n-8e, a wildcat 4 miles west of Welty, in Okfuskee County, has casing run to the top of the Cromwell sand at 3,514 ft. following a 70-minute drill-stem test in that sand which yielded 2,400 ft. of oil, 60 ft. of oil-cut mud, and 30 ft. of muddy salt water. Total depth is 3,522 ft. Location is 1¾ miles south of another new producing area opened by the same operators.

OKLAHOMA SUCCESSFUL WILDCATS

Creek County: W&B Oil Co. 2 Tarr, SE NE

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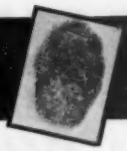

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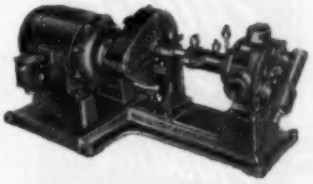

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BARTLESVILLE, OKLA.

NW 3-16n-7e, flowed 200 bbl. of oil from Simpson sand 2,998-3,018 ft., TD 3,018 ft. (new pay in Cushing pool).

Lincoln County: Earl E. Barnes 5 Ross, SW SW SE 13-14n-4e, flowed 960 bbl. of oil from Red Fork 4,040-53 ft., TD 4,053 ft. (new pay in West Davenport Dist.)

Samedan Oil Corp. 1 Cunningham, NW NW SW 20-15n-4e, flowed 1,420 M.c.f. of gas from Red Fork 4,218-66 ft., TD 5,037 ft.

Okfuskee County: E. L. & M. Drilling Co. 1 Armstrong, NW NW NW 30-13n-10e, flowed 112 bbl. of oil from second Dutcher 2,924-34 ft., TD 3,691 ft.

OKLAHOMA WILDCAT FAILURES

Carter County: Earl G. Lewis-Cockburn & Payton 1 Lindsay, W½ SW SW NW 29-2s-1w, dry, TD 2,002 ft.

Cleveland County: Ohio Oil Co. 1 Houston, NW NW SW 14-6n-1e, dry, TD 6,648 ft.

Lincoln County: Falcon Seaboard et al 1 Mitchell, SW SW NE 13-13n-3e, dry, TD 5,316 ft.

Ralph O. Brown 1 Neer, NE NE SE 6-13n-4e, dry, TD 5,240 ft.

Mid-Continent 1 Clegern, NW NE NW 28-15n-4e, dry, TD 5,041 ft.

An-Son Petroleum Corp. 1 Lawrence, NE SE SE 25-18n-4e, dry, TD 4,628 ft.

Love County: Transcontinental Oil Corp. 1 Leeper, SW SE SE 31-9s-2e, dry TD 4,813 ft.

Pawnee County: Warren Oil Corp. 1 Tathwell, NW NE NE 31-21n-4e, dry, TD 4,303 ft.

Payne County: Foster Drilling Co. 1 Benton, NW NW NE 23-18n-8e, dry, TD 3,170 ft.

Wilcox Oil Co. 1 Ward, NE NE SW 25-20n-2e, dry, TD 4,770 ft.

Louisiana-Ark.

Rapides Wildcat Coring Ahead

SHREVEPORT. — The California Co. was coring ahead below 9,575 ft. at 1 Long Bell Petroleum Co., Inc., wildcat in Rapides Parish. Saturated oil sand of the Wilcox was recovered on core from 9,392-9,405 ft. The sand had very good permeability and porosity with good stain and odor.

A new shallow gas pay is indicated at Grand Cane in De Soto Parish at The Texas Co. 1 Huhn et al, C NW SE 19-13n-14w, east offset to recent oil discovery. The well flowed dry gas at the rate of 2,980 M.c.f. per day from perforations 2,928-40 ft.

A leaking packer has delayed tests on a Bossier Parish wildcat, Continental Oil Co. 1 Goodwin, Redland prospect. The wildcat is bottomed at 11,307 ft. with 5½-in. casing cemented at 7,450 ft. The well tested gas from Travis Peak perforations at 7,370-80 ft. and 7,357-66 ft. Perforations were then made in Pettit at 6,335-45 ft.

Southwest Gas Producing Co. and W. C. Feazel have backed up to test Travis Peak at 1 Redwine, 1,675 ft. from north line, 685 ft. from west line in NE 11-17n-3w, Lincoln Parish, after finding no commercial production in the Cotton Valley. The wildcat is located 5½ miles east of Simsboro field.

The wildcat flowed an estimated 500 M.c.f. of gas per day from a series of perforations at 10,070-90 ft. in Cotton Valley. Perforations have been made from 9,656-57 ft. and a squeeze job effected to insure shutoff from other formations. Crews will perforate at about 9,700 ft. A good showing of gas-con-

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densate was recovered earlier on drill-stem test. Total depth is 10,638 ft.

LOUISIANA SUCCESSFUL WILDCAT

De Soto Parish: The Texas Co. 1 Huhn, C NW SE 19-13n-14w, flowed 7,250 M.c.f. of gas per day from Fredericksburg 2,928-40 ft., TD 4,307 ft. (new pay in North Grand Cane pool).

LOUISIANA WILDCAT FAILURES

Concordia Parish: Barnett Serio et al 1 Concordia Bank & Trust Co., 18,700 ft. S and 1,750 ft. E of NWc of Twp. in 57-8n-10e, dry, TD 6,010 ft.

Barnett Serio et al 1 Kelly, C SE SE 21-5n-7e, dry, TD 7,015 ft.

Lincoln Parish: Southewest Gas Producing Co. 1 McFarland, 300 ft. S and 133 ft. E of C 3-19n-1w, dry, TD 8,950 ft.

ARKANSAS WILDCAT FAILURES

Columbia County: Lawton Oil Corp. 1 R. Goode "A," C SE SW 36-18s-19w, dry, TD 9,413 ft.

Lyons, McCord & Logan 1 Allie Vaughn Est., C SW NW 3-17s-20w, dry, TD 7,709 ft.

Houston Oil Co. 1 Hollingsworth, 565 ft. E and 575 ft. S NWc SE SW, 8-17s-18w, dry, TD 7,405 ft.

Ouachita County: W. H. Bryant et al 1 Tutt, C NW SE NW 11-14s-18w, dry, TD 2,153 ft.

Kansas

St. John Area Wildcat Is Lansing Producer

ANSCHULTZ DRILLING CO. is putting its 1 Schultz, NE NE NW 20-23-13, 2 miles north of St. John, Stafford County, on the pump for completion following swabbing tests which produced at the rate of 3½ bbl. of oil per hour. The well opens a new producing area 2½ miles from nearest other production, the Merle pool to the south. Pay zone is the Lansing-Kansas City lime, opposite which casing is perforated at 3,634-50 ft.

In southwestern Stafford County, near the Edwards county line, Cities Service Oil Co. is preparing to test its new gas-discovery well, 1 Westgate, NE SE NE 6-25-16. Indicated pay zone is in the upper part of the Mississippian, topped at 4,164 ft. During a 60-minute drill-stem test of an interval at 4,170-4,206 ft., the well flowed at an estimated rate of more than 4,000,000 cu. ft. per day. Since that test, the hole has been deepened to the Arbuckle without further indications of commercial production. Arbuckle was logged at 4,520-70 ft. Casing was run through the Mississippian pay zone to 4,280 ft.

Testing also is getting under way at Jackson Drilling Co.'s prospective discovery well, 1 Crissman, NE NE SW 16-23-14, also in Stafford County. It found indications of production both in the Lansing-Kansas City section, topped at 3,539 ft., and the Simpson, topped at 3,964 ft. A 60-minute drill-stem test in Simpson sand at 3,982-92 ft. yielded 65 ft. of heavily oil and gas-cut mud. Best showings, previously reported, were in the Lansing-Kansas City lime. Total depth is 4,083 ft. in Arbuckle lime, topped at 4,029 ft.

KANSAS SUCCESSFUL WILDCATS

Barton County: Honaker Drilling Co. 1 Witte, SW SW SW 21-19s-14w, flowed 2.2 million cubic feet of gas from Sooy 3,498-3,501 ft., TD 3,552 ft.

Graham County: Jones, Shelburne & Farmer 1 Noah "D," N WNW SE 27-10s-21w, 236 bbl. of oil from Arbuckle 3,786-93 ft., TD 3,793 ft. (Noah pool).

Lans County: Hugoton 1 Floyd, NW NE SW 19-17s-29w, pumped 160 bbl. of oil from 4,333-52 ft., TD 4,705 ft. (North Fork).

Rooks County: Herndon Drilling Co. 1 Chesney, NE NW SE 18-8s-16w, pumped 62 bbl. of oil from Lansing-Kansas City 3,050-67 ft., TD 3,067 ft. (opens Medicine Creek pool).

Stafford County: Cooperative Refining 1 Byer "B," SE SE NW 27-24s-12w, pumped 341 bbl. of oil from 3,915-31 ft., TD 4,124 ft. (opens North Star pool).

KANSAS WILDCAT FAILURES

Barber County: Anschutz 1 Winters, SW SW NE 7-33s-15w, dry, TD 5,385 ft.

Clark County: Gulf Oil Corp. 1 Abel, C SE SE 21-31s-23w, dry, TD 6,995 ft.

Cowley County: Wakefield 1 Bernstorff, SW NW SW 33-31s-4e, dry, TD 3,033 ft.

Cappitt 1 Bergling, NW NW NE 31-34s-4e, dry, TD 3,293 ft.

Ellis County: Walters Drilling Co. 1 Gasaway, SW SW SW 12-11s-19w, dry, TD 3,590 ft.

Graham County: Anschutz 1 Gibb, NE NE NE 2-7s-22w, dry, TD 3,885 ft.

Rooks County: Murfin 1 Schindler, NE NE SE 16-8s-17w, dry, TD 3,454 ft.

Stafford County: K&E et al 1 Jenkins, SW SW SW 9-25s-12w, dry, TD 4,188 ft.

Jackson 1 Sutton SE SE SW 6-23s-14w, dry, TD 4,105 ft.

Trego County: Jones, Shelburne & Farmer 1 Zerfas, SE SE SE 9-14s-22w, dry, TD 4,315 ft.

EASTERN NEBRASKA WILDCAT FAILURES

Cherry County: Champlin 1 Dorsey, SE SE SE 12-30n-40w, dry, (no info.)

Champlin 1 Shadbolt, NW NW NW 1-31n-37w, dry, (no info.)

Harlan County: American Plains 1 Schluntz, SW SW SE 35-2n-17w, dry, TD 3,965 ft.

Richardson County: J. E. Polensty 1 Fritz, CS½ SW 2-2n-15e, dry, TD 2,476 ft.

Eastern Texas

New Wildcat Tests Slated in East Texas

DALLAS.—New exploration tests for East Texas counties included two in Cherokee County, and one each in Houston and Henderson counties.

In Cherokee County, Shell Oil Co. 1 H. E. Pryor was located 6 miles southwest of Rusk in the J. T. Jones Survey. Elevation on the proposed 5,500-ft. test was estimated at 335 ft.

V. B. Stones was located on a 750-acre lease in the Perry Reese Survey, 6 miles southwest of Price. Contract depth was 3,800 ft. and elevation was 340 ft.

In Houston County, American Liberty Oil Co. and others 1 J. B. Clegg, Jr., was projected to 6,000 ft. Location is 2½ miles north of Augusta.

In Henderson County, E. L. Howard 1 E. N. Colley was located in the R. B. Warren Survey, 5 miles southeast of LaRue. Contract depth was 5,800 ft.

EAST TEXAS (Districts 5 and 6) WILDCAT FAILURES

Houston County: C. W. Gilbert & Associates 1 Harry Bush, Bishop & Anderson Sur., A-1,125, dry, TD 6,050 ft.

Kaufman County: J. A. Peden 1 Mitchell,

J. K. Taylor Sur., dry, TD 3,610 ft., Woodbine 3,590 ft.

Robertson County: A. H. and C. L. Rowan 1 W. C. Anderson, Letson Purdy Sur., A-34, dry, TD 1,950 ft.

California

Shallower Miocene Sand Added At Wheeler Ridge

LOS ANGELES.—Richfield Oil Corp.'s recent Eocene discovery at Wheeler Ridge in southeast San Joaquin Valley has been enhanced by the addition of a shallower Miocene sand.

A drill-stem test at 6,300-6,500 ft. indicated 76-29 Kern County Land would make a substantial producer at that depth as it flowed 44°-gravity crude at the rate of 1,100 bbl. daily. Following the test, however, drilling was resumed toward the 9,500-ft. Eocene sand. The Miocene discovery is located 1,000 ft. southwest of the Eocene producer, which during its drilling indicated the shallower section might be productive. Both are in SE 29-11n-20w.

A wildcat 2½ miles southeast of this activity reportedly is being planned by Intex Oil Co. Located in 4-10n-20w, it is scheduled to be started in mid-July and will test both of the new deeper zones. Another wildcat shortly to be started in this area will be a Continental Oil Co. test in 1-10n-20w, on Kern County Land about 1½ miles southwest of Tejon production.

A deal in which Seaboard Oil Co. acquired a one-half interest in properties of Southern California Petroleum Corp. in Secs. 9, 10, and 16 shortly will result in the former starting a wildcat about ½ mile north of Del Valle production in Los Angeles County. Objective of the well will be to test all zones above a depth of about 6,500 ft.

Sunray Oil Corp. abandoned its wildcat ¾ mile southwest of Newhall-Potrero production after drilling to 9,483 ft. Site of the test was in NW 34-4n-17w.

CALIFORNIA SUCCESSFUL WILDCATS

Los Angeles County, ¼-mile-southeast extension to Placerita field: Recknagel & Mangold Oil Co. 1 D. W. P. City, NW SW 6-3n-15w, pumped 35 bbl. per day through perforations at 980-1,140 ft., 12°-gravity crude, 1 per cent cut. Kraft zone 980 ft., TD 1,140 ft.

Yolo County, ½-mile northwest extension to Winters field: Mohawk Petroleum Corp. 1 Winters Comm. One, NE NW 13-8n-1w, flowed at daily rate of 3,500 M.c.f. through 16/64-in. bean. McCune gas sand 4,999 ft., TD 5,051 ft.

CALIFORNIA WILDCAT FAILURES

Contra Costa County, Frank's Tract area: Shell Oil Co. 1 Webb Tract, 34-3n-3e, dry, TD 5,000 ft.

Kern County, Comanche Point area: Wa-Me-Co. Drilling Co. 1 G.M.T., 27-12n-18w, dry, TD 680 ft., elev. 1,029 ft.

Tejon Hills area: Commonwealth Finance Co. 4-1 Tejon, 4-11n-18w, dry, Santa Margarita 805 ft., valv. shale 1,295 ft., TD 1,441 ft.

Ten Section area: Kern County Land Company 44-33 KCY, 33-30s-26e, dry, TD 8,667 ft.

Monterey County, Salinas Valley area: Terminal Drilling Co. 1 Teddy, 26-23s-12e, dry, TD 4,143 ft.

San Benito County, Lomerias area: Tide Water Associated Oil Co. 1 O'Connell, 5-12s-4e, dry, TD 7,234 ft.

Lonoak area: W. W. Holmes 1 Chambers, 15-18s-9e, dry, TD 4,500 ft.

San Joaquin County, Rio Vista area: Brazos Oil & Gas Co. 1 Geo. H. Jensen A, 33-4n-4e, dry, bottomed in Midland sand, TD 4,567 ft.

Permian Basin

Winkler Has Flush Ellenburger Prospect

MIDLAND.—Flush Ellenburger production was in prospect for southeast Winkler County, between Wheeler and North Monahans fields, at Stanolind Oil & Gas Co. 1-B Wight.

Last reported drill-stem test from 11,551-96 ft. flowed oil at the rate of 627 bbl. per day during the last 30 minutes of a 4-hour test.

On the test, gas surfaced in 68 minutes, water blanket in 2 hours and 15 minutes and oil in 2½ hours. Oil was 43° gravity, flowing pressure ranged from 875-3,000 psi., and 15-minute shut-in pressure reached 4,175 psi.

Top of the Ellenburger was 11,520 ft. A previous test in the Ellenburger developed 135 ft. of oil at 11,506-56 ft. Location in 25-40-PSL is about 1 mile northwest of Stanolind's 1-A Wight, which was attempting completion

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as an Ellenburger pumper from perforations at 11,507-67 ft.

In Crockett County, east of Todd Deep field, Lion Oil Co. 1 Shannon was retreating the Ellenburger through perforations at 7,380-7,413 ft. After cleaning, the well flowed 14 bbl. of oil for 1 hour through 20/64-in. choke; then made 17.9 bbl. of oil in the next 1½ hours on 16/64-in. choke, and 21.6 bbl. in 2½ hours on 14/64-in. choke. Top of the Ellenburger was 6,936 ft., on estimated elevation of 2,660 ft. Indicated gas-distillate pay in the top of the Ellenburger had not been tested. Location is about 3 miles southwest of the prolific Elkhorn-Ellenburger field.

Acid treatment had increased the rate of flow at Atlantic Refining Co. 1-C-48 University, Ellenburger wildcat and south extension to Barnhart field of Reagan County.

Following treatment, the well kicked off to gage 165 bbl. of oil in 24 hours through ½-in. choke from perforations at 9,060-9,124 ft. Previous gage was 159 bbl. of oil.

Texas Eastern Production Corp. spotted location for its first deep test in West Texas as the 1 David Fasken "O," in 5-40-T&P, in southeastern Andrews County. Proposed depth was 14,000 ft.

Signal Oil & Gas Co. announced plans for a Devonian wildcat in 423-D-John Gibson Survey, which falls 3 miles west of the town of Plains in central Yoakum County. Proposed depth was 12,500 ft.

Definition on the south side of Wilshire-Ellenburger field was apparent at Sinclair Oil & Gas Co. 5 Windham, 128-D-CCSD&RGNG. Operators were to deepen from 12,453 ft. in an effort to obtain steady flowing production. Present total depth was reported as close to the field's water table.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Runnels County: Warren Oil Corp. 1 C. P. Spill, N. Travis Sur., A-533, TD 4,264 ft., Palo Pinto 3,346 ft., pay 3,376 ft., IP 30 bbl. 42°-gravity oil.

Midwest Oil Corp. 1 Ralph Burns, Lot 11, Sec. 444, TD 4,646 ft., elev. 1,995 ft., pay 4,459 ft., IP 1½ bbl. 42°-gravity oil, 13/64-in. choke.

Upton County: Gulf Oil Corp. 1 Rancho Wolfcamp, 121-D-CCSD&RGNG, TD 11,300 ft., elev. 2,819 ft., perforated 9,765-9,860 ft., IP pumped 61 bbl. 40°-gravity oil, GOR 1,231 cu. ft.

Southray Oil Co. 1-A X. B. Cox, 19-B-CCSD&RGNG, TD 7,148 ft., elev. 2,741 ft., pay 7,050 ft., IP 133 bbl. 37°-gravity oil, 18/64-in. choke, TP 300 psi., GOR 814 cu. ft.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Concho County: Hubert Stokes 1 R. A. Hafner, Section 1,850, 10 miles NE Millersview, dry, TD 3,003 ft. in dolomite.

Crockett County: Southern Production Co. 1 University, 28-41-University, dry, TD 1,720 ft., San Andres 1,505 ft.

Gaines County: Gustave Ring 1 Ella Malone, 236-G-WTRY Co., dry, TD 7,505 ft., elev. 3,416 ft., ates 3,595 ft., San Andres 5,230 ft.

The Texas Co. 9 Wharton, 15-A21-PSL, dry, TD 7,337 ft., elev. 3,332 ft., Glorietta 5,810 ft., Tubbs 7,127 ft.

Union Oil Co. of California 1 Jones, 14-A7-PSL, dry, TD 17,380 ft., elev. 3,679 ft., Wolfcamp 9,430 ft., Mississippian 11,570 ft., Woodford 12,302 ft.

Garza County: Rex M. Alworth et al 1 E. M. Woodward, 105-5-H&GN, dry, TD 3,010 ft.

Hockley County: S. F. Hurlbut 1 Ruth Seals, 13-15-Howard CSL, dry, TD 10,011 ft., elev. 3,437 ft., Dean 7,960 ft., reef 9,700 ft.

King County: Burdell Oil Co. 1-A W. R. Rose, Sec. 1, MEP&P, dry, TD 5,560 ft.

Menard County: Deep Rock Oil Co. 1 W. P. Bevans, 31-A-GH&SA, dry, TD 5,148 ft.

Pecos County: Hunt Oil Co. 41 Elsinore, 65-D-GC&SF, dry, TD 971 ft.

Runnels County: Bill L. Holland 1 L. J. Allcorn, Sec. 133, ETRR, dry, TD 2,259 ft., elev. 1,908 ft., Serratt 2,128 ft.

LaGloria Corp. 1 W. P. King, Sec. 20, J. Barefoot Sur., dry, TD 3,936 ft., Gardner 3,861 ft., lower Gardner 3,901 ft.

Miami Operating Co., Inc. 1 Bryan Clayton, A. Losoya Sur. 515, dry, TD 4,079 ft., Caddo 4,035 ft.

Tom Green County: Echols and Covill 1 Otto Bubenick, H. Fey Sur. 827, dry, TD 394 ft., elev. 1,961 ft., Glorietta 290 ft.

Upton County: Phillips Petroleum Co. 1 University GG, 5-58-University, dry, TD 7,664 ft., elev. 2,654 ft., Spraberry 6,768 ft.

Ward County: Hissom Drilling Co. 1 T. B. Pruett, 20-1-W&NW, dry, TD 4,921 ft., elev. estimated 2,704 ft., Delaware 4,909 ft.

TEXAS PANHANDLE

Kerr-McGee Oil Industries, Inc., is pump testing a Pennsylvanian granite wash discovery in Hartley County at 1 Berneta, Section 29, Block 21, State Capitol Lands Survey. The well pumped 106 bbl. of oil in 24 hours from perforations 5,740-48 ft. and 5,713-28 ft. with 211 bbl. in 48 hours reported on latest gage.

In Roberts County Gulf Oil Corp. 2 John Haggard established a Railroad Commission potential flow of 110.57 bbl. of oil in 6 hours with 5,289 M.c.f. of gas daily from Brown dolomite pay at 4,009-38 ft.

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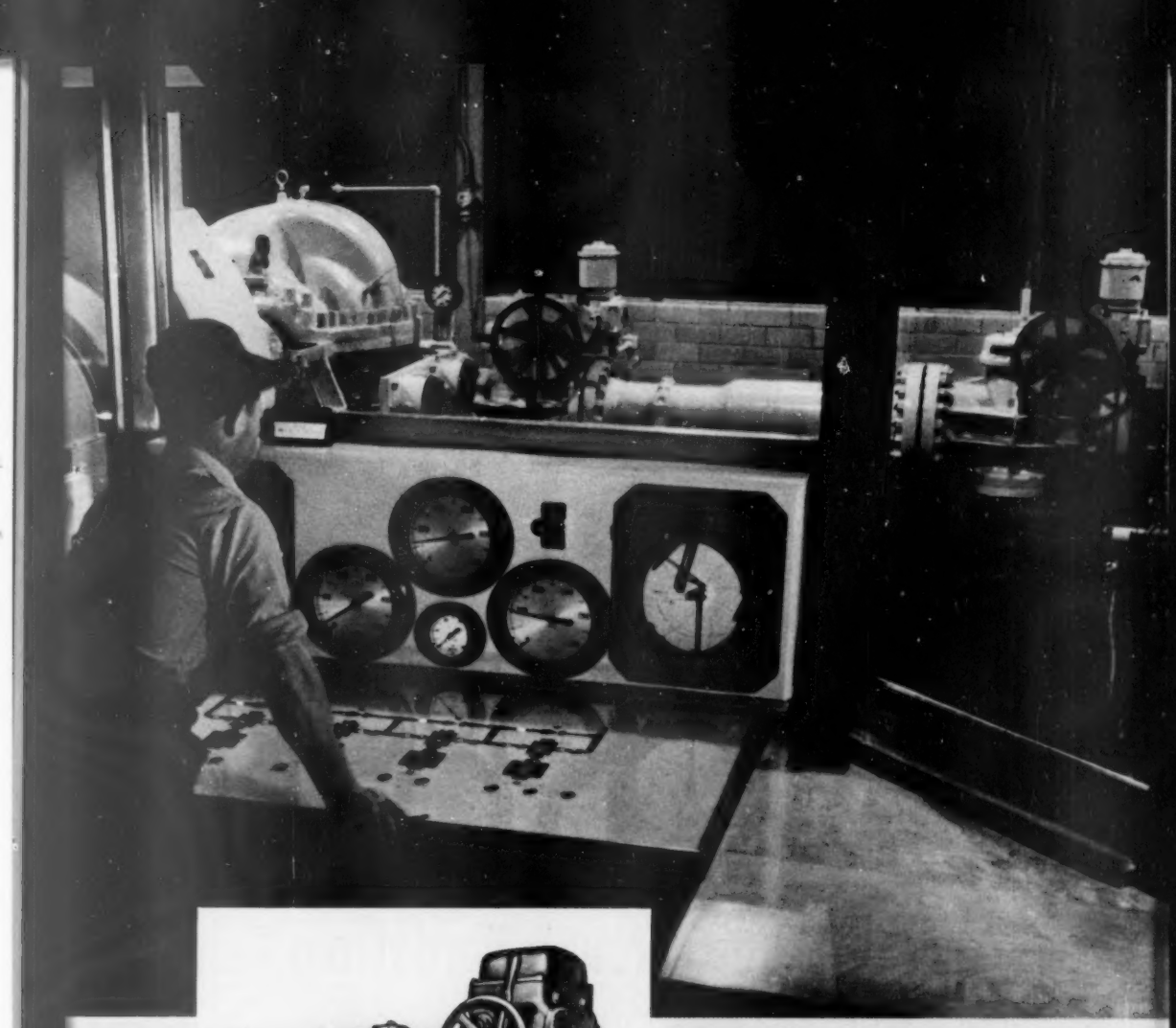

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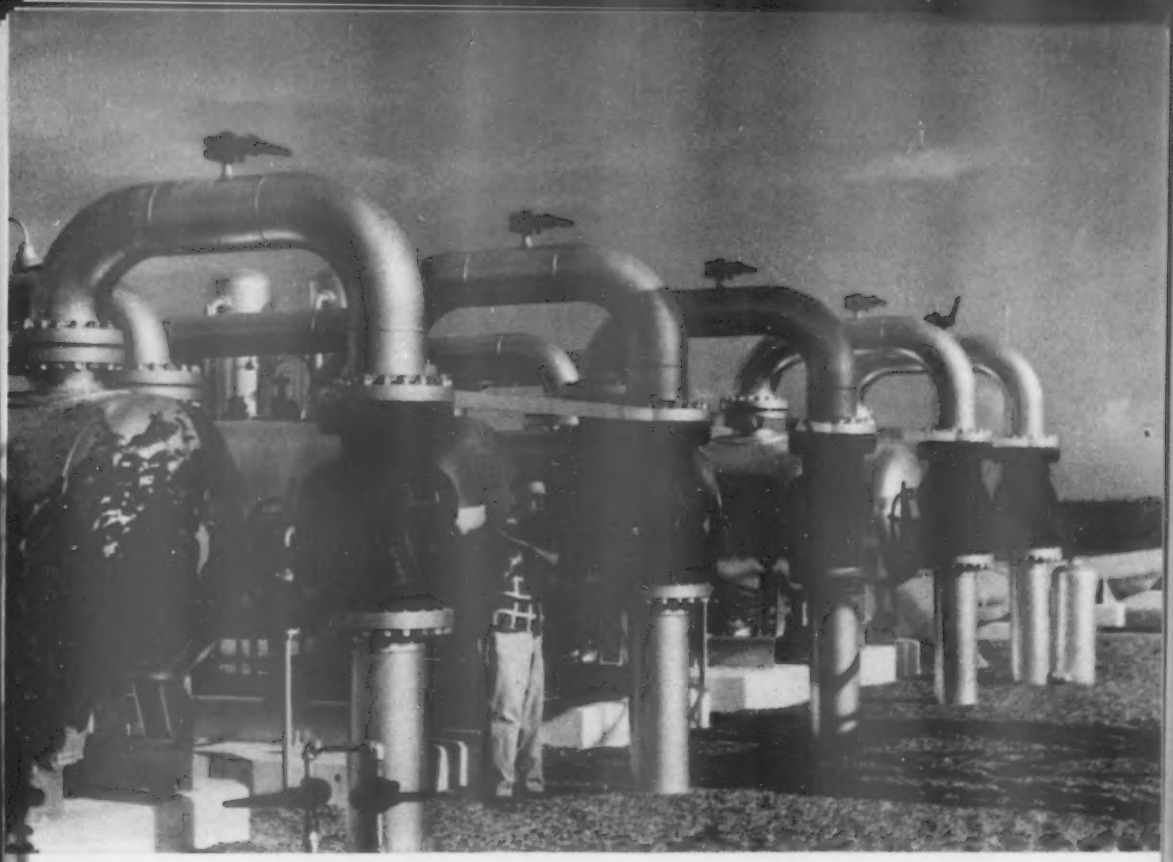

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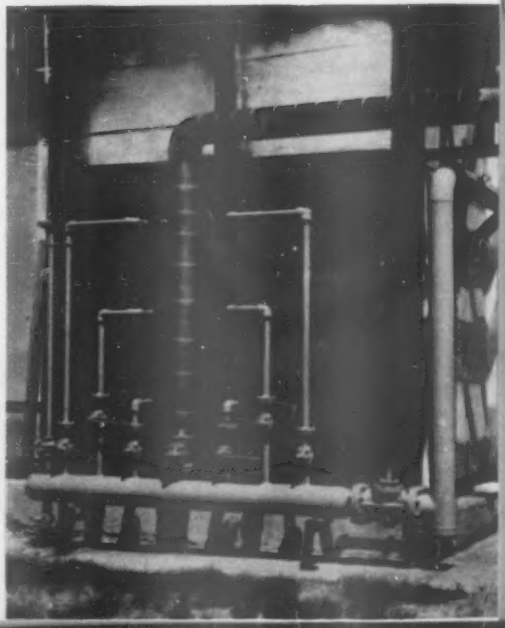

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Central Area

ILLINOIS

Noah Petroleum Co.'s oil discovery well, 1 E. A. Harrell, 2 miles northeast of Norris City, White County, swabbed at the rate of 72 bbl. of oil per day while cleaning out after a 65-quart shot. Pay zone is Hardinsburg sand at 2,614-25 ft. in open hole below 2,610 ft. Location is in the NW NW NE 14-6s-8e. It is a mile from other production.

Goodman Oil Co. 1 Smothers, NE NE NW 17-3s-9e, a west step-out test for the Goldengate Consolidated pool, in Wayne County, made 8 bbl. of oil with 8 bbl. of water per day while testing its prospective Aux Vases pay zone at 3,339-75 ft. Total depth is 3,487 ft.

INDIANA

Casing has been run to test indicative oil and gas showings encountered in Cypress sand in Slagter Producing Co.'s Leffler wildcat in the SE NE SE 25-3s-10w, 4 miles northwest of Elberfield, Gibson County. A drill-stem test of the pay at 1,636-61 ft. filled 490 ft. of clean oil and 10 ft. of mud-cut oil in 2 hours with bottom-hole pressure of 640 psi. Bottom of the hole still is in saturation. Casing is at 1,634 ft.

WESTERN KENTUCKY

Charles Morburger appears to have an exceptionally good producer for the Livermore area, 5 miles southeast of Calhoun, McLean County. The well, 1 Storey, 25-M-29, is estimated good for 100 bbl. of oil per day on the pump, producing from Waltersburg sand at 1,357-75 ft. and Barlow (Cypress) sand at 1,521-39 ft. It filled 1,000 ft. of oil following a 70-quart shot.

MICHIGAN

A big Salina gas well was being tested in Casco Township, St. Clair County, by Panhandle Eastern Pipe Line Co. after acid treatments with a total of 5,000 gal. Although good information regard the test of the gas flow from this wildcat was not officially released, it was learned through usually reliable sources that well gaged at approximately 15,000,000 cu. ft. of gas a day. This figure was reported to be within a half million cubic feet of the actual gages taken at the well.

This new potential Salina gas discovery was Panhandle's 1 Ringel, C SE 31-4n-15e. Wildcat was drilled into the Niagaran to 2,763 ft., total depth. Top of Niagaran was reported at 2,577 ft., and the section under test was from 2,496-2,535 ft. where 120 perforations were made and then this opened pay was acidized with 2,000 and 3,000 gal. It was indicated that more perforating and testing would be done. Pay section was reported at 2,467-2,505 ft. and it was expected that next perforating would be ordered for from about 2,467-96 ft. Pay was described as being a limestone-dolomite which was found at a shallower depth in the Salina than the gas pay now being produced by Panhandle in Howell field, Livingston County, closest Salina gas pool in Michigan. It was believed that company would drill five or more tests in this same general area during the summer.

ILLINOIS SUCCESSFUL WILDCAT

Lawrence County: Charles Zanetis 1 Wright, NW SW SW 30-5n-12w, IP 8 bbl., Benoist 1,669-95 ft., TD 1,685 ft.
NW NW SE 21-1n-2w, dry, TD 2,760 ft.

ILLINOIS WILDCAT FAILURES

Clinton County: Sun Oil Co. Schmitzmeyer, Mark Twain Oil Co. 1 Krause, NE NW NE 8-1s-5w, dry, TD 2,101 ft.
Collins Brothers 1 Diekemper, NE NW NE 24-2n-2w, dry, TD 2,945 ft.
Superior Oil Co. 1 Breese-Trenton-Richter, SW NW SE SE 23-2n-4w, dry, TD 3,242 ft.

Hamilton County: Deep Rock Oil Corp. 1-A Sigler, SW SE NE 12-6s-7e, dry, TD 3,451 ft.
Calvert Drilling, Inc., 1 Hunt, SE NE NE 11-7s-7e, dry, TD 3,242 ft.

Jasper County: C. E. Brehm 1 Henry, NE NE SE 12-5n-10e, dry, TD 3,025 ft.

Jefferson County: Collins Brothers 1 Maxy, NW SW NE 23-2s-2e, dry, TD 2,779 ft.

Marion County: J. C. and C. M. Fisher 1 Hurd, NE NW SE 2-2n-1e, dry, TD 3,444 ft.

(Continued on page 157)

Southwest Texas

Dual Completion Brings New Pay To Portilla

CORPUS CHRISTI.—Superior Oil Co. has reported dual completion of the 49 Minnie S. Welder opening a new oil pay for Portilla field. On a 24-hour potential test through perforations at 7,984-90 ft., well flowed 131 bbl. of 39.6°-gravity oil per day on a 7/64-in. choke under tubing pressure of 925 psi. Gas-oil ratio registered 2,798-1. Lower sand was topped at 7,982 ft. Hole is bottomed at 8,300 ft. with 7-in. production string cemented to 8,300 ft. Operators ran 2½-in. tubing at 7,954 ft. for completion. Location is on the C. J. Francisco and E. Portilla Survey, A-25, Section 19, San Patricio County.

Pure Oil Co. has set 5½-in. casing at 9,472 ft. at the 1 State Tract 285, in Kenedy County. Cores from 9,479-81 ft. recovered shale and sandstone with good shows in the sand. Hole is bottomed at 9,489½ ft. in sidetrack hole. No further details have been reported. Location is on the Laguna Madre Tract 285.

David L. Gordon 1 Dario Salinas, oil discovery wildcat, is located 6 miles northeast of Conception in Duval County. The new discovery potentialed 83 bbl. of 45.1°-gravity oil per day on a 12/64-in. choke with tubing pressure registered at 50 psi. and casing pressure registered at 210 psi. Gas-oil ratio is 390-1. Completion was finaled through perforations at 4,503-07 ft. with hole bottomed at 6,822 ft. and 5½-in. production string cemented to 4,564 ft. Production is from the Frio formation. Discovery is on the J. A. Gonzales Grant, A-227, Share 8.

Melvin L. Rossman has staked location for a 6,000-ft. wildcat test as the 1 H. W. Good Enough. Location for drill-site is on Survey 93.2 and 60 Bandera County, 2½ miles northeast of Bandera. Operators will commence immediately.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Jim Wells County: Chas. A. Daubert & Walter J. Achning 1 C. Scheuenemann et al, Blk. 13, S. A. de Agua Dulce Sur., 5,330 ft., perf. 5,317-27 ft., IPF 37.65 bbl. oil per day, 7/64-in. choke. 46.2°-gravity oil, pay zone Stillwell.

Nueces County: Eastern States Petroleum Co.-Humble Oil & Refining Co. A-1 Luling Foundation unit, F. Z. Bishop S/D, Sec. 161, perf. 7,098-7,104 ft., IP 9,500,000 cu. ft. gas open flow, prod. zone L. Pfluger.

Starr County: Burdette Graham 1 H. P. Guerra, Las Cuevitas Grant, TD 2,260 ft., prod. zone Gort Wells, perf. 2,255-60 ft., IPP 66.07 bbl. oil per day, 39°-gravity oil.
R. E. Schiefelbein 1 Samuel Pena et al, Share 81, Por. 81., TD 1,620 ft., perf. 1,120-34 ft., IP 1,300,000 cu. ft. gas, ¼-in. choke.

Willacy County: The Texas Co. 7 Yturrio Land & Cattle Co., Jose Narciso Cabazos Grant, A-8, TD 10,514 ft. IPF 6,700,000 cu. ft. gas per day, 47° gravity, perf. 9,900-27 ft.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Bexar County: F. E. Waldrop and H. S. Ball 1 E. Beam, J. Adignowity Sur. 310, dry, TD 450 ft.

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Mellie Esperson Est., San Martin Grant Sh. 2, Blk. 18, dry, TD 12,956 ft.

Duval County: J. M. Gorman 1 Elfred Withers, H&GN Sec. 334, A-1478, dry, TD 1,956 ft.

Jim Hogg County: C. C. Dauchy 1 P. B. Harbison, El Sordo Grant, Sec. 4, A-326, dry, TD 4,006 ft.

Martin, Skelly & Thomas 1 Reubin Holbein, Las Animas Grant Sh. 3, Sec. 11, Blk. 7, dry, TD 3,435 ft.

Sun Oil Co. & Geo. H. Coates C-1 Alonzo Ramirez, Mauel Ramirez Sur., A-258, dry, TD 4,834 ft.

Jim Wells County: Sam Cunningham 1 Leonara Perez, La Tinaja de Lara Grant Sh. 3, dry, TD 5,342 ft.

Kennedy County: Humble Oil & Refining Co. 1 Mesquire Rincon, Jose F. Balli-Big Barreta or Laguna Madre 335, dry, TD 12,001 ft.

Nueces County: Republic Natural Gas 1-78 Chapman Ranch, Mrs. Bertha Cunningham Laurless Farm Tr. Sec. 78, dry, TD 7,574 ft.

San Patricio County: J. M. Flatz & R. B. Mitchell 1 Buresh et al, Patrick Fitzsimmons Lge., Lot 10, Coleman Fulton Pasture S/D, dry, 8D 6,009 ft.

Ray M. Southworth and Messer 1 B. Garcia, Third S/D Taft Farm Lands, Sec. 23, Blk. 5, dry, TD 6,915 ft.

Starr County: Sun Oil Co. and Geo. W. Coates 1 F. L. de Valverde, Santa Cruze Grant, Francisco Farlia Sh. 4, dry, TD 7,500 ft.

Travis County: Henry Boedeker 1 Leo Luedtke, P. Golden Sur., dry, TD 872 ft.

Webb County: Panhandle Oil Co. 2 J. C. Martin, El Ranchito and Blas Uribe S/D, Jose Borrego Grant, dry, TD 1,846 ft.

South Louisiana

New Cockfield Pool In Beauregard Reported

NEW ORLEANS.—Vincent and Welch of Lake Charles have reported a new pool from the Cockfield sands at 1 Long Bell Lumber Co., section 35-4s-8w, Beauregard Parish. Latest test flowed estimated 30 bbl. oil through perforations from 8,313-29 ft. on ⅛-in. choke. Test, located 12 miles southeast of DeRidder townsite, is bottomed at 8,564 ft. with 5½-in. casing cemented at 8,410 ft. and 2-in. tubing swung at 8,304 ft. Prior to testing, electric log run to total depth showed estimated 16 ft. of saturated oil sand at 8,313-29 ft. Operator is continuing to test and clean out the well prior to taking potential.

Cities Service Oil Co. is in process of completing the 1 F. P. Guidry, confirmation test in the Bourg area, Terrebonne Parish with a flow of 17 bbl. of distillate per each 1,000,000 cu. ft. of gas daily through dual perforations at 12,624-628 ft. on 15/64-in. choke being reported. Test, located in section 36-17s-18e, earlier flowed at rate of 1,622,000 cu. ft. of gas plus 22.9 bbl. of distillate per day on ⅛-in. choke through the same intervals under 5,300 psi.

Helis Petroleum Co. drilled to a total depth of 9,900 ft. the 1 Slack Bros. in Iberville Parish. 7-in. casing has been cemented at 9,704 ft. and well has been perforated from 9,175-84 ft. prior to testing. Location is in section 7-7s-10s. Prior to setting casing, electric log was run to 9,183 ft., but no comment has been made.

The Texas Co. has reported cementing 5-in. casing on the 1 C. A. Canty, wildcat in the Shell Island area, St. Mary Parish, at total depth of 13,016 ft. Test is located in section 1-18s-11e approximately 2 miles north of Atchafalaya Bay. Prior to cementing casing, electric log was run to 12,019 ft., but no report has been released.

SOUTH LOUISIANA WILDCAT FAILURES

Allen Parish: Shell Oil Co. 1 J. A. Bel, 5-6s-3w, C SE NE, 3 miles N of Elton field, dry, TD 10,016 ft.

Ascension Parish: The Texas Co. 1 Estelle E. Lanoux et al, 20-9s-3e, dry, TD 12,058 ft.

Beauregard Parish: Atlantic Refining Co. 1 Central Coal & Coke Corp., 4-5s-9w, dry, TD 11,606 ft.

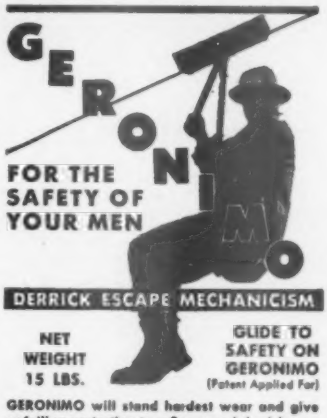
Calcasieu Parish: Nilco Co. 1 A. E. Perkins Est., NW Sec. 5 miles E of Lucas, dry, TD 7,542 ft.

Terrebonne Parish: The Texas Co. 1 La Terre Co. Washa Lake, 7-20s-15e, dry, TD 13,575 ft.

Mississippi

Completion Reported At Forrest Discovery

JACKSON.—Ohio Oil Co. 1 Coleman-Powe, Section 5-1s-12w, Forrest County, Mississippi has been officially completed as gas-condensate discovery. The well is in Maxie field. On completion test which was run recently the well flowed 8,113 M.c.f. gas plus 167 bbl. of 59.6°-gravity condensate per day through 25/64-in. choke. Tubing pressure was 2,453 psi. and casing pressure was 2,754



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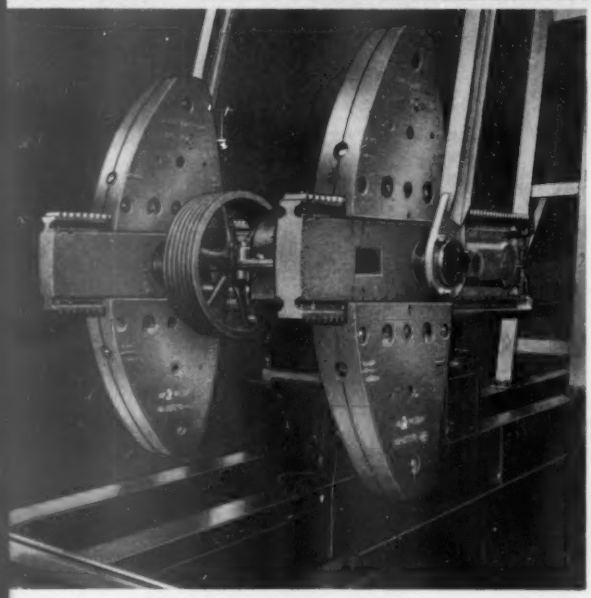

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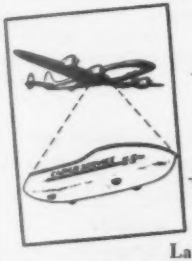
C&S NEW LUXURY CONSTELLATIONS OFFER FASTEST SERVICE BETWEEN HOUSTON AND CHICAGO; HOUSTON AND DETROIT; NEW ORLEANS AND DETROIT.



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Large SPEEDPAK units, carrying as much as most two-engine cargo planes, are attached to the 300-mile-per-hour C&S CONSTELLATION . . . providing a lower deck exclusively for cargo. C&S is the *only* air line operating SPEEDPAK service to Cuba, Jamaica and Venezuela!

CHICAGO & SOUTHERN AIR LINES

Offices in Principal Oil Centers in the United States

psi. Gas-oil ratio was 48,569 to 1. Completion was from perforations 7,303-20 ft. Total depth of well was 9,006 ft.

Sun Oil Co. 1 McCardle-Clark unit, Section 18-1s-13w, has encountered shows of gas in the lower Wilcox in Pistol Ridge field, Forrest County, Mississippi. Log and sidewall cores indicated sand with good shows of gas at 4,989-94 ft. Top of the Wilcox was picked at 2,806 ft. This test encountered faulting at base of Chalk (6,976 ft.) with approximately 250 ft. displacement. Shows of gas were recovered in cores from the upper Tuscaloosa gas zone, but salt water was recovered on drill stem test at 7,425-31 ft. Operators are now drilling ahead to the lower Tuscaloosa.

Continental Oil Co. 1 Lee, Section 4-9n-2e, is reported drilling at 13,647 ft. From the slow rate of drilling the past few days, it is possible that the well is now in Buckner.

MISSISSIPPI SUCCESSFUL WILDCAT

Forrest County: Ohio Oil Co. 1 Coleman-Powe, 5-1s-12w, TD 9,006 ft., IP 3,113 M.c.f. gas plus 167 bbl. condn. 24 hours, 25/64-in. choke, 59.6° gravity.

MISSISSIPPI WILDCAT FAILURES

Adams County: B. Serio 1 Zerkowsky Est., 69-7n-2w, dry, TD 6,227 ft.

Franklin County: Kemp Drilling Co. 1 U.S.A., 32-5n-2e, dry, TD 7,004 ft.

FLORIDA WILDCAT FAILURE

Santa Rosa County: I. P. and Fred La Rue 1 Cain Bynum, 4-5n-29w, dry, TD 6,770 ft.

ALABAMA WILDCAT FAILURES

Conecuh County: Southern California Petroleum Co. 1 Evergreen Heading Co., 12-6n-11e, dry, TD 6,011 ft.

Escambia County: Humble Oil & Refining Co. 1 Clarence L. G. Kelly et al, 32-1n-9e, dry, TD 6,250 ft.

Washington County: J. Paul Ratliff, Jr. 1 C. D. Scott, 6-5n-4w, dry, TD 7,500 ft.

Texas Gulf Coast

Grimes Test Indicates Distillate Production

HOUSTON.—J. M. West 2 Olla Heath Garrett has indicated new gas-distillate production in extreme northern Grimes County, near the Madison county line. Well is at a total depth of 9,470 ft. in Buda lime, running a series of tests on that formation. No information has been released as yet on the current tests, but prior tests farther up the hole have made definite indications of gas-distillate production.

Warren Oil Corp. has set a string of 5½-in. casing at 3,445 ft. in its 1 Joe J. Hanak wildcat in Colorado County about 4 miles southwest of Columbus field. Hole was drilled to a total depth of 10,015 ft., but electrical log and sidewall samples failed to reveal any shows worth testing below the 3,400-ft. depth, so production string was set to that level to test upper shows. Well is on the W. K. Paulding Survey, A-403, 3 miles southwest of Columbus townsite.

L. M. Josey, Inc., 1 B. Settegast has indicated probable new gas-distillate production in preliminary tests from the 7,371-76 ft. level, in Fort Bend County. Drill-stem test in perforations at 7,571-76 ft. had a slight show of gas, distillate, and salt water, and operators have squeezed off the section for reperforation. Total depth of the well is 8,082 ft., with 5½-in. casing set at 7,630 ft. Location is in Brooks and Burleson Survey 9, A-444.

Jake L. Hamon has a new oil discovery at the 1 Margarita S. de Flores in Starr County 4 miles southeast of Davenport field. A drill-stem test on the interval 4,750-53 ft. using ¼-in. chokes and 500 ft. of water cushion recovered the water cushion and 1,350 ft. of pipe-line oil on a 35 minute test. Another test on the interval 4,754-58 ft. using ¼-in. chokes and no water cushion recovered 630 ft. of pipe-line oil in a 45-minute test.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCAT

Hardin County: Meredith, Clegg & Hunt et al 1 Bruce Jackson et al, Henry Binns Lge., A-6, TD 8,521 ft., prod. zone: Wilcox, perf. 8,148-54 ft., 120,000,000 cu. ft. gas per day on open flow, 57 bbl. dist. per million cu. ft. gas, 65.6° gravity.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Brazoria County: Skelly Oil Co. 1 T. W. Roark, Francis Moore Sur., A-100, dry, TD 10,250 ft.

Galveston County: E. J. Hudson 1 Kirby Petroleum Co., Duff unit, W. K. Dalton Sur., A-54, dry, TD 8,677 ft.

John W. Mecom 1 St. of Texas Lse. 31845, East Galveston Bay Tr. 238, dry, TD 10,235 ft.

Liberty County: J. M. Flaitz 1 B. H. Willis Est., T&NO RR Sur. 33, A-375 dry, TD 8,754 ft.

COST CUTTING COMBINATION

Truco DIAMOND BITS

D&S CORE BARRELS

Drilling & Service

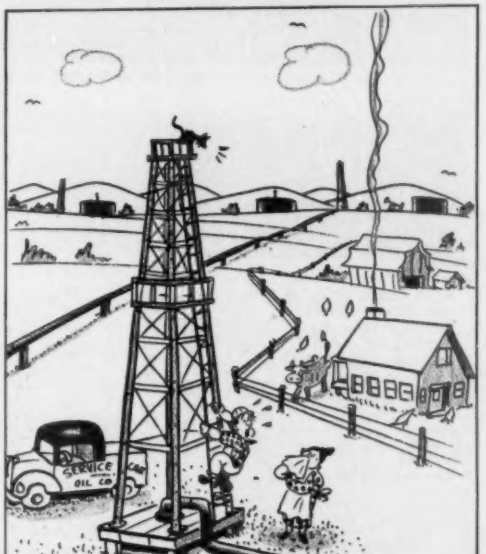
3031 Elm Street Dallas 1, Texas

OFFICE PHONE: Riverside-6811
NIGHT NUMBERS: TRemont-5559, Victor-3708

Other Offices-Services: Tyler, Texas.....2-2742; Odessa, Texas....6-6774; Abilene, Texas....2-2790; Victoria, Texas.....3264; Norman, Okla.....4360; Shreveport, La....5-5474; Casper, Wyo.....3739; Carmi, Ill.....7799; Ft. Morgan, Colo....1143; Great Bend, Kans...7995

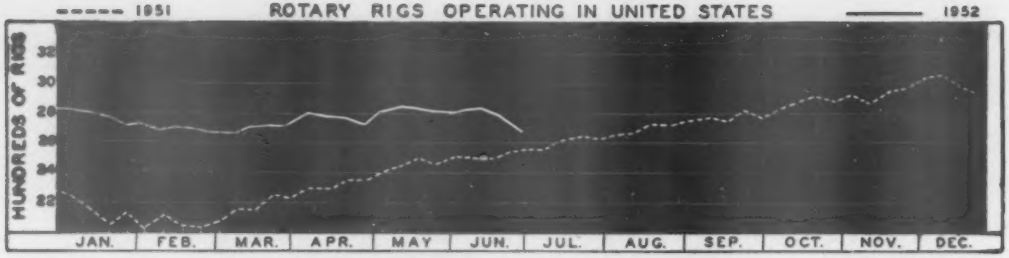
Distributors: Diamond Drilling Co., 2759 E. Willow St., Long Beach, Calif., Telephone: Long Beach 40-7949; Allied Services, Inc., Mt. Pleasant, Michigan Telephone: 29-861

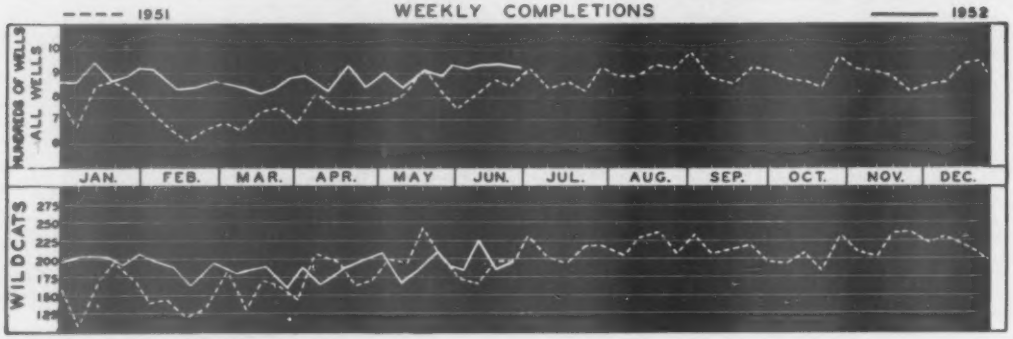
Foreign: D. T. O'Connor, 500 Fifth Avenue, New York, N. Y. Petroleum Industry Consultants, C. A., Caracas, Venez. Denton - Spencer Co., Ltd., Calgary, Alberta, Canada.



THE OIL AND GAS JOURNAL

"Look, Lady—can't you keep that cat in the house?"





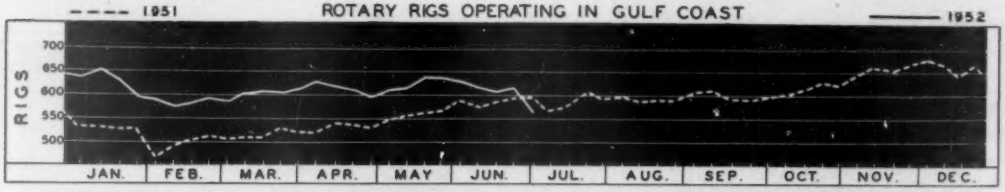
CURRENT STATISTICS

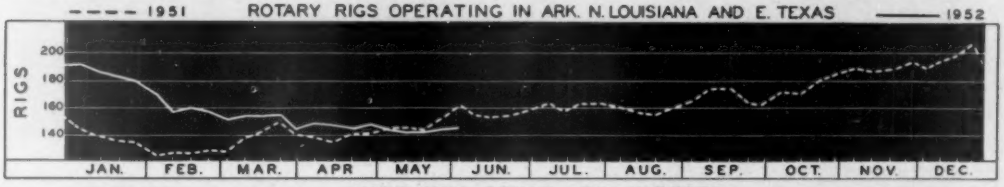
EXPLORATION

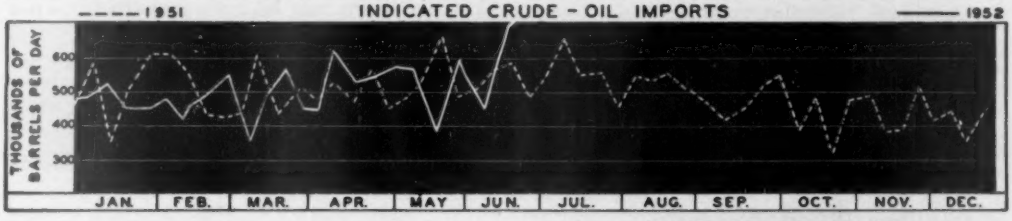
WEEKLY WELL COMPLETIONS . . . WEEK ENDED JUNE 28, 1952

	Total of all wells					June 28		Wildcat completions and discoveries					Cumulative total, 1952				
	Comp.	Oil	Gas	Dry	Footage	1952	1951	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	15	8	0	*7	20,000	351	294	0	0	0	0	0	0	0	0	0	0
Pennsylvania	42	21	4	†17	73,900	850	777	0	0	0	0	0	0	0	0	2	2
West Virginia	12	1	10	1	34,811	317	282	0	0	0	0	0	0	0	2	3	5
Ohio	25	13	8	4	62,775	481	420	0	0	0	0	0	0	0	7	7	14
Indiana	25	10	1	14	52,707	558	539	0	0	0	4	4	17	0	2	158	177
Kentucky	27	9	5	13	51,500	642	544	2	0	0	4	6	12	0	0	113	125
Illinois	43	15	0	28	111,232	803	1,080	1	0	0	15	16	8	0	0	229	237
Michigan	11	4	0	7	22,160	341	359	0	0	0	4	4	14	0	2	119	135
Kansas	105	56	6	‡43	358,508	2,394	2,144	4	0	1	10	15	51	0	8	378	437
Nebraska	9	2	0	7	33,391	122	121	0	0	0	7	7	4	0	0	68	72
Oklahoma	99	58	2	39	374,425	2,967	2,712	3	0	1	10	14	58	2	8	301	369
Texas	344	210	19	115	1,711,807	8,895	8,133	15	0	5	65	85	401	32	62	1,865	2,360
North Central (Dist. 7-B & 9)	97	39	5	53	360,743	2,770	2,495	8	0	2	31	41	225	1	22	777	1,025
West (Dist. 7-C & 8)	123	94	0	29	714,583	2,791	2,451	4	0	0	16	20	77	0	3	337	417
Panhandle (Dist. 10)	15	8	6	1	42,613	324	340	0	0	0	0	0	1	0	3	22	26
Eastern (Dist. 5 & 6)	12	8	1	3	56,784	462	607	0	0	0	0	0	15	3	1	101	120
Gulf Coast (Dist. 2 & 3)	42	30	1	11	293,889	1,307	1,135	1	0	0	4	5	47	19	14	267	347
Southwest (Dist. 1 & 4)	55	31	6	18	243,195	1,241	1,105	2	0	3	14	19	36	9	19	361	425
Louisiana	45	29	1	15	287,750	1,105	994	0	0	1	8	9	20	11	6	131	168
Northern	25	18	1	6	80,209	589	512	0	0	1	3	4	8	0	6	58	72
Southern	20	11	0	9	207,541	516	482	0	0	0	5	5	12	11	0	73	96
Arkansas	12	6	0	6	55,394	191	185	0	0	0	4	4	4	0	0	34	38
Mississippi	3	1	0	2	22,237	174	149	1	0	0	2	3	9	1	1	71	82
Southeastern States	4	0	0	4	26,461	30	30	0	0	0	4	4	1	0	1	18	20
Montana	9	3	1	5	19,313	124	93	0	0	0	0	0	2	0	1	25	28
Wyoming	15	9	2	4	85,947	340	332	1	0	1	0	2	15	0	3	49	67
Colorado-Utah	16	6	1	9	96,407	246	125	2	0	0	8	10	14	0	7	92	113
New Mexico	20	9	8	3	123,875	504	323	0	0	0	1	1	20	2	1	52	75
California	43	30	2	11	177,291	1,243	1,076	1	0	1	8	10	43	0	3	241	287
North Dakota	5	3	0	2	45,119	23	3	0	0	0	1	1	3	0	0	5	8
Miscellaneous (Md., Ariz.)	2	0	1	1	7,906	38	51	0	0	1	1	2	0	0	11	15	26
Total United States	931	503	71	357	3,854,916	22,739	20,766	30	0	11	156	197	696	48	125	3,976	4,845
Total previous week	937	513	60	364	3,783,254	....	....	21	0	2	160	183	666	48	114	3,820	4,648
Total June 30, 1951	924	470	69	385	3,618,922	....	....	27	2	13	190	232	709	40	132	3,631	4,512

Service wells included: *7, †15, ‡5.



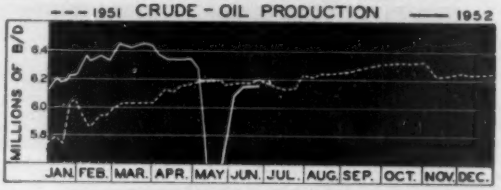


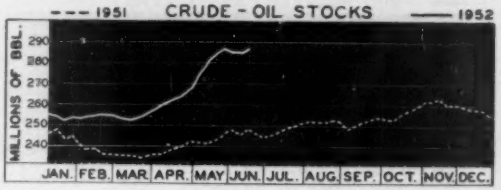


DAILY AVERAGE PRODUCTION FOR WEEK

	June 28, 1952			June 21
	Crude oil	Lease condensate	Total	total
Alabama	2,850	.....	2,850	2,800
Arkansas	76,175	4,225	80,400	80,100
California	987,800	.....	987,800	987,800
Colorado	81,500	.....	81,500	80,400
Eastern	58,800	.....	58,800	58,800
Florida	1,725	.....	1,725	1,725
Illinois	170,500	.....	170,500	173,900
Indiana	33,700	.....	33,700	32,700
Kansas	307,500	.....	307,500	308,100
Kentucky	34,100	.....	34,100	33,700
Louisiana	626,900	37,700	664,600	665,550
North	110,400	13,250	123,650	124,600
South	516,500	24,450	540,950	540,950
Michigan	39,900	.....	39,900	34,900
Mississippi	92,600	4,150	96,750	97,300
Montana	27,800	.....	27,800	28,000
Nebraska	7,000	.....	7,000	6,600
New Mexico	164,675	425	165,100	165,000
Oklahoma	508,600	.....	508,600	510,700
Texas	2,655,650	43,850	2,699,500	2,699,500
Dist. 1	31,625	125	31,750	31,750
Dist. 2	143,725	3,850	147,575	147,575
Dist. 3	437,100	25,000	462,100	462,100
Dist. 4	236,800	4,500	241,300	241,300
Dist. 5	54,075	250	54,325	54,325
Dist. 6	115,375	4,400	119,775	119,775
East Texas field	270,000	.....	270,000	270,000
Dist. 7-B	92,450	75	92,525	92,525
Dist. 7-C	132,375	5,075	137,450	137,450
Dist. 8	896,850	200	897,050	897,050
Dist. 9	162,700	375	163,075	163,075
Dist. 10	82,575	.....	82,575	82,575
Utah	4,400	.....	4,400	4,300
Wyoming	189,000	.....	189,000	185,000
North Dakota	2,800	.....	2,800	2,800
Total U. S.	6,073,975	90,350	6,164,325	6,159,675
Change from previous week, up			4,650	
Canada	192,200	.....	192,200	222,500

Cumulative figures to be resumed when complete totals for strike period are available.



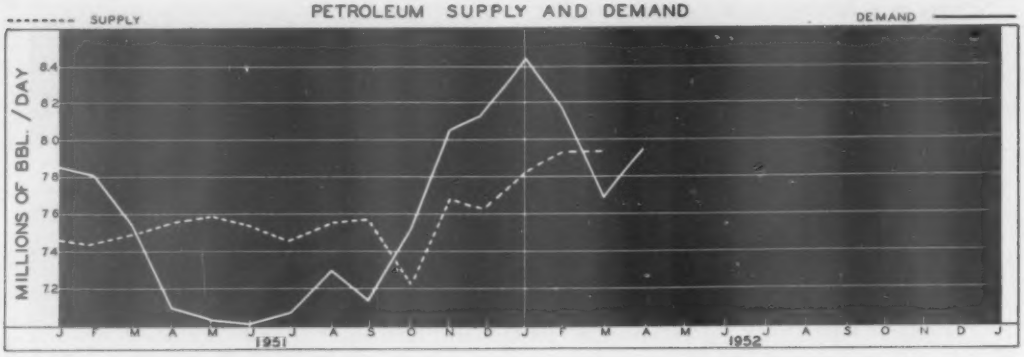


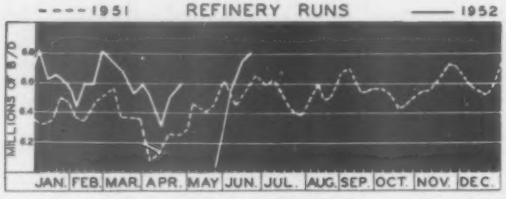
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

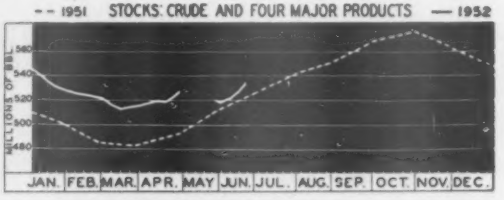
(Thousands of barrels)

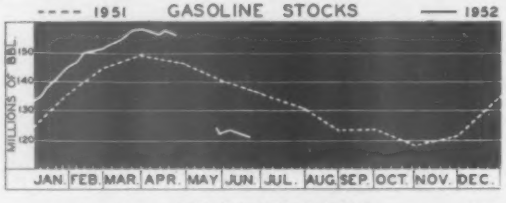
	June 21, '52	June 14, '52	June 23, '51
Pennsylvania Grade	2,527	2,564	2,134
Other Appalachian	2,086	2,090	1,528
Illinois, Indiana, Michigan	12,924	13,063	11,274
Arkansas	3,269	3,223	2,929
Louisiana	15,182	15,327	14,499
North	2,621	2,768	2,987
Gulf	12,561	12,559	11,512
Mississippi	3,427	2,959	3,166
New Mexico	7,618	7,741	6,634
Oklahoma and Kansas	43,691	42,804	37,706
Texas	142,653	141,090	115,321
East Texas proper	14,512	14,335	(†)
West Texas	60,860	60,403	(†)
Texas Gulf	31,953	31,267	(†)
Other Texas	35,328	35,085	(†)
Rocky Mountains	15,161	15,233	13,946
California	30,957	30,240	30,528
Foreign	8,150	8,572	7,934
Total	287,645	284,906	247,599

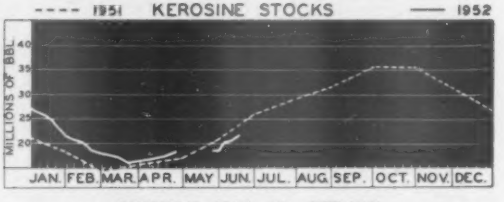
*Bureau of Mines. †Not comparable with current week.

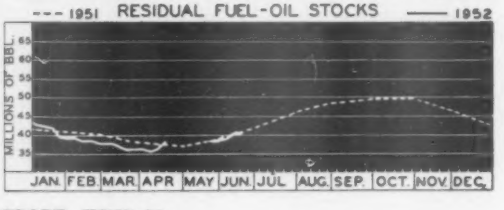










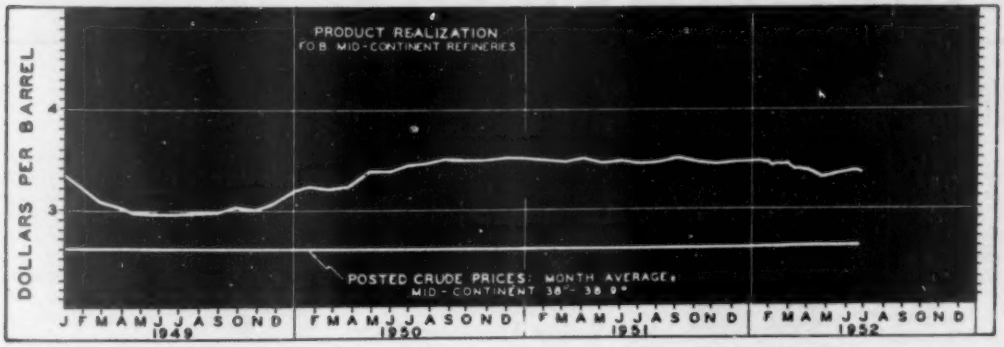


A.P.I. REFINERY REPORT, JUNE 28

(Thousands of barrels)

District—	Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.	Stocks‡ Gaso.†	Kero.	Dist.	Resid.	Bureau of Mines, June 1951 Daily avg. runs	Daily average production Gaso.*	Kero.	Dist.	Resid.
East Coast	1,173	425.1	35.8	247.4	239.7	29,000	9,613	19,809	11,939	1,042	404.4	45.2	225.7	242.9
Appalachian:														
District 1	120	50.6	5.1	14.9	12.6	3,593	490	1,019	711	106	49.9	6.5	13.3	9.6
District 2	83	43.7	3.9	16.4	14.0	1,780	232	377	291	76	36.9	4.4	8.6	17.1
Ind., Ill., Ky.	1,232	682.4	65.8	229.6	151.7	24,539	4,232	12,864	5,537	1,210	634.3	64.2	193.7	156.7
Okla., Kans., Mo.	566	316.1	17.9	114.6	61.6	11,563	1,420	8,931	1,597	546	290.0	18.6	123.7	66.7
Inland Texas	274	185.6	10.3	44.4	39.0	3,946	390	1,314	987	257	160.2	12.4	39.5	44.1
Texas Gulf Coast	1,640	719.3	114.8	408.8	290.2	17,219	2,980	7,252	6,721	1,567	707.9	113.6	330.7	248.9
La. Gulf Coast	531	244.4	60.0	121.1	60.0	6,315	1,709	2,347	1,936	500	242.3	38.8	126.4	65.2
N. La. and Ark.	80	30.0	7.9	20.9	5.9	2,683	555	1,011	223	76	29.6	6.4	17.5	7.7
Rocky Mountain:														
New Mexico	18	10.0	.....	2.9	3.7	120	.....	66	30	14	7.5	0.2	2.7	3.3
Other Rocky Mtn.	233	111.0	5.6	46.3	44.1	4,525	391	1,577	1,237	237	108.9	4.0	45.3	46.7
California	999	434.9	17.0	170.7	361.4	15,619	326	7,576	13,763	944	428.2	12.9	126.7	367.9
June 28, 1952	6,949	3,253.1	344.1	1,438.0	1,283.9	120,902	22,338	64,143	44,972	6,575	3,100.1	327.2	1,253.8	1,276.8
June 21, 1952	6,805	3,179.7	311.3	1,483.9	1,227.9	121,613	21,865	60,905	42,822	.....	.....	.....	.....	.....
June 30, 1951	6,595	3,118.3	297.1	1,247.4	1,290.9	136,355	26,271	70,001	42,046	.....	.....	.....	.....	.....

*At refineries including natural blended. †Finished and unfinished. ‡At refineries, bulk terminals, in transit and in pipe lines.


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
DOLLARS PER BARREL
4
3
POSTED CRUDE PRICES: MONTH AVERAGE
MID-CONTINENT 38°-38.9°
J F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951
F M A M J J A S O N D
1952

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate and fuel oil. Realization averaged $3.34 for week ended June 21, $3.37 for previous week, and $3.49 for June 1951. The above trend information is based on volumes and current prices and therefore does not reflect changes in operating costs.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of July 2, 1952. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge)	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅜-10½	12.125-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅜-11½	13.5-13.75	11¾-12
42-44 w.w. kerosine	8¾-9	10.65	9
No. 2 straw fuel oil	7¾-8	9.65	8
No. 6 residual	$1.00-1.30	$2.35-2.50	$1.70-1.85

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6.1	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	27-28
200 vis., No. 3 neutral, 0-10 pp.	14.5-15.5

Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	5.5

RAPID gains in residual inventories reflect the general condition of the heavy-fuel market in most areas of the country. Stocks increased almost 2,000,000 bbl. for the week ended June 21. The increase of more than 900,000 bbl. in the Texas Gulf Coast district was probably due in part to the movement out of the Mid-Continent.

Small amounts of residual were moving out of the Kansas-Oklahoma area to regular customers in North Central states, but no spot sales were reported except for shipments to the Gulf Coast.

Shipments of residual out of the Mid-Continent to the Gulf Coast last winter delivered on the gulf for as high as $1.95 a barrel for a netback to the inland refiner of about $1.15. Spot sales for tank-car movement to the Gulf Coast in May were based on a delivered price of $1.75. Recent deliveries have been reported at $1.45 for a netback of about $0.77 for a Mid-Continent refiner. Even if the steel mills are back in operation by the middle of July, it will take some time for related heavy industries to get back into full production. Residual-fuel prices may be soft for most of the summer.

The increase in ceiling prices for kerosine and distillate fuels on the East Coast will tend to promote a normal flow of light fuels to secondary storage during the summer months. The stock loss during the refinery strike started some marketers looking for firm sources of supply. Until the new ceilings were established, primary suppliers were moving very little light fuel except to regular customers.

The new ceiling for barge deliveries of No. 2 fuel in New York Harbor is 9.65 cents a gallon. Kerosine is 1 cent higher. No. 1 and No. 3 fuels carry normal differentials compared with No. 2.

Gasoline markets are firm in all areas. Gasoline stock reductions have been below normal since the strike, but total stocks are still well below last year.

CRUDE PRICES

GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93			
19-19.9	1.98			
20-20.9	2.03	$2.25		$2.12
21-21.9	2.07	2.27		2.14
22-22.9	2.12	2.29		2.16
23-23.9	2.18	2.31		2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9		2.51	2.74	2.38
34-34.9		2.53	2.76	2.40
35-35.9		2.55	2.78	2.42
36-36.9		2.57	2.80	2.44
37-37.9		2.59	2.82	2.46
38-38.9		2.61	2.84	2.48
39-39.9		2.63	2.86	2.50
40 and above		2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.	
Kettleman Hills, California*	$2.80
Louisiana:	
Beauregard Parish	2.60
Cotton Valley (distillate)	2.85
Cotton Valley (crude)	2.70
Texas:	
East Texas	2.65
Pecos County (Yates)	2.35
Conroe	2.83
Van	2.48
Pennsylvania Grade:	
Bradford	4.25
Southwest Pennsylvania	3.82
West Virginia	3.76
Illinois Basin	2.77

*37°-37.9°.

EQUIPMENT MEN . . . in the News

United Supply Elects King Vice President

C. G. KING

Announcement has been made of the election of C. G. King, Jr., as vice president of United Supply & Manufacturing Co. of Tulsa. King's headquarters will be at Houston.

King was formerly division manager in charge of all operations in the Louisiana and Texas Gulf Coast areas. In his new capacity as vice president he will continue to serve the same region.

King joined the company as a salesman in 1944, and 2 years later he was promoted to the position of assistant district manager. In 1948 he was named district manager in charge of all United Supply stores and offices in the Texas Gulf Coast area. In 1950 he was promoted to serve as division manager of all Louisiana and Texas Gulf Coast operations.

Cementing Techniques Available in Color Film

For the first time, a complete picture of what takes place under the ground during cementing procedures is available in a color film recently produced by Weatherford Oil Tool Co., Inc., of Weatherford and Houston. The length of the film is approximately 15 minutes, with about one-half the time consumed with live action above the ground, while the remainder of the film presents an animated description of cementing the pipe in the hole.

Installation of the cementing tools, scratchers, and centralizers, on the casing is shown in detail. The proper method of rolling the pipe, spinning and stabbing it, is illustrated.

Clipper Vice President Resigns to Form New Firm

Robert G. Evans, one of the original founders of the Clipper Manufacturing Co., has announced the formation of a new company to distribute masonry and concrete-sawing equipment.

In the field of diamond blade research and development, Evans has long been a nationally recognized authority, not only for blade specifications, but on all types of cutting equipment and machinery. Products will be marketed under the trade name "Target."

Target blades will introduce an entirely new system to accurately identify blade specifications for different materials. In place of usually complex symbols, color will be used, such as Target gold blades for hard materials, blue blades for medium, and red blades for soft or abrasive products.

Jack McKay Appointed Fluor Sales Promotion Manager

JACK McKAY

J. P. Wiseman, vice president in charge of sales for The Fluor Corp., Ltd., Los Angeles, has announced the appointment of Jack McKay as manager of the sales promotion department. McKay will be in charge of advertising, publicity, exhibits, and all phases of sales promotion.

McKay joined Fluor in 1942, and for the past 8 years has been directly connected with sales, serving as a sales engineer, assistant to director of sales, and assistant district sales manager of Fluor's Houston district sales office for the past 2½ years.

Lone Star Steel Adds Johnson to Sales Staff

L. G. JOHNSON

In preparation for the completion of its oil-field tubular-goods mill, Lone Star Steel Co. has added L. G. (Jerry) Johnson to its sales staff, according to Walter T. Moreland, vice president, sales. Johnson will be in charge of sales of steel tubular goods.

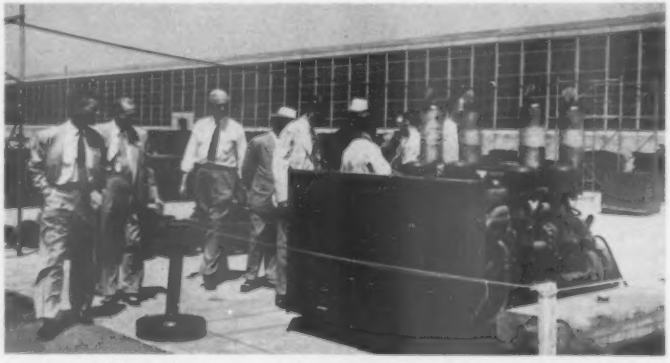
Johnson formerly was associated with Republic Steel Corp. in both Cleveland and Los Angeles, American Steel Warehouse Co. in Portland, Ore., and, most recently, with Kaiser Steel Corp.'s Houston office.

U. S. Rubber Names Smith to Succeed Andersen at Tulsa

N. L. Smith has been named to replace J. M. (Andy) Andersen as assistant to the district sales manager of the Tulsa branch of United States Rubber Co. Smith has worked for Mechanical Goods Division of the company for 29 years.

Andersen is retiring after 28 years with United States Rubber at Tulsa.

Harnischfeger Dedicates New Diesel Engine Plant



In early June Harnischfeger Corp. officially opened its new diesel-engine division in Crystal Lake, Ill., bringing to nine the number of P&H plants now in operation. The cornerstone-laying ceremony was begun with a welcome by Karl P. Schoeppner, general manager of the diesel-engine division. Keynote address was delivered by Walter Harnischfeger, president, in which he reviewed the 68-year history of the company and the development of its products which, in addition to diesel engines, include power shovels, truck cranes, soil stabilizers, overhead cranes, electric hoists, welding equipment, and prefabricated homes. Henry Harnischfeger, executive vice president, and Fred Saiditt, vice president, also spoke briefly. Following the dedication guests toured the new one-story building which occupies over 100,000 sq. ft., and is located on an 80-acre tract of land.

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EQUIPMENT FOR SALE

PIPE
All sizes; line pipe and casing, tanks, and Oilfield supplies. Edco Pipe & Supply Co. Phone 45970. P.O. Box 151, Tulsa, Oklahoma.

FOR SALE at Sasakwa, Oklahoma, 3350', 13⅜" OD, 2325' 12" plain end, used, ¼" wall line pipe, 2.00 per foot, 2500' 13" OD 50# Lapweld casing. Cities Service Oil, Patridge, Bartlesville, Oklahoma.

FOR SALE: Good 3½" and 4½" OD Drill pipe. Two EKU Waukesha's, One RL Cardwell, Hercules Engine, Tanks, Treaters, Pumping units. Rogers Pipe & Supply Co., 620 Wright Bldg., Tulsa, Oklahoma.

FOR SALE near Russell, Kansas, approximately 80,000' 2" water line buried and must be removed between harvest and planting time. Cities Service Oil Company, Patridge, Bartlesville, Oklahoma.

1—36L Bucyrus-Erie Spudder, powered by GK 145 Waukesha Motor, complete with 7" and 5" tools, steel dog house, Kohler light plant skid mounted. NOTE: This machine is in excellent condition. Priced $20,000.00 complete. P.O. Box 87 or telephone 1064 or 1519, Salem, Illinois.

CARDWELLS FOR SALE
FOR SALE: 2—Model "RL" Cardwell spudding units. Serial Nos. 560 and 578, powered by 145 GK Waukesha engines, complete with all tools for 7" and 5½" hole and necessary equipment for 24-hour service. 1—Model "RL" Cardwell beam unit, Serial No. 598, powered by Model 6DC344 Buda engine, Serial No. 301808, with diesel fuel system, complete with all tools for 7" and 5½" hole and necessary equipment for 24-hour service. Call telephone 5732 or write P. O. Box 183, Great Bend, Kansas.

NEW FRACTIONATING TOWER

One (1) New fractionating tower, 5' 0" I.D. x 89' 6" over-all height x 1⅛" plate. Thirty-four (34) bubble trays, ten (10) 18" 300# manways. Stress relieved and built in accordance with API-ASME Code for 250 PSI working pressure. Located Watt Metal and Boiler Works, Houston Shops.

ROCK ISLAND OIL & REFINING CO., INC.
321 W. Douglas Wichita, Kansas
Phone 5-3674

STEEL STORAGE TANKS

11—55,000 bbl. Tanks—114'6" dia. x 30' high

10—80,000 bbl. Tanks—117'6" dia. x 41' high

All tanks steel roof, riveted construction throughout. Standing location near Mexia, Texas, and suitable for re-erection. Detailed specs. and prices available on request.

SOUTHERN IRON & METAL CO.
Box 3270, Beaumont, Texas

MID-STATES PIPE & SUPPLY CO.
Box 2834, Tulsa, Okla.

ROGERS & WRIGHT, INC.
215 Wright Bldg., Tulsa, Okla.

HORWITZ PIPE & STEEL CO.
Box 1406, Oklahoma City, Okla.

EQUIPMENT FOR SALE

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VALVES • FLANGES • FITTINGS
it's
Newman's Inc.
"One of the Southwest's Leading Distributors"
Tulsa, Okla. P.O. Box 1865 Ph. 25228-LD 635

FILTERS for Oil Clarification
22—Sperry 18" x 18" Filter Presses, plate and frame, closed delivery, 11 chambers, ½".
1—Tolhurst 42" center slung Chip Wringer, 7½ hp. Motor.
CONSOLIDATED PRODUCTS CO., INC.
17-20 Park Row New York 38, N. Y.
BArclay 7-0600

EQUIPMENT FOR SALE

10,000' 4½" API Full Hole Drill Pipe tested by Sonoscope engineers, also 1075' 6⅝" OD 36# Drill Pipe, like new. Milford Giffin, Tel. 477, Hoisington, Kansas.

FOR SALE at our Oklahoma City warehouse, Attention: Mr. T. P. Mace 50,000' 3" 7.67#—40,000' 4" 10.79#—6,000' 6" 12.89#—8,000' 6" 18.97#. All used plain end, cleaned and beveled. 24,000' 3½" OD 4.95# plain beveled new seamless line pipe. Cities Service Oil Co., Patridge, Bartlesville, Okla.

Gaso Duplex 4½" x 6" Power Pumps with Chrysler C-36 Engines, skid mounted, immediate delivery. Also Byron Jackson, Carter Centrifugal Units. Westinghouse 20-25-50 KW Generating Units.

H. H. COFFIELD
Attn.: W. H. ORR
Phones: 132—Rockdale, Texas
AT-3427—Houston, Texas

NATURAL GAS ENGINES——GENERATORS

Three Minneapolis-Moline Natural Gas Engines, 225 H.P. 650 R.P.M., 8"x9", 6 cyl. Type NE.
One 152 KW, Allis-Chalmers Generator, 3 ph., 60 cyl, 220 volts, 900 R.P.M.
One 180 KW, General Electric Generator, 3 ph., 60 cyl, 220 volts, 770 R.P.M. Type ATE-10-225 M, Form P.B.

Note: Generators are connected to two of above engines, sheave and V-belt drive.

Units Completely Reconditioned

REFINERY & GASOLINE PLANT EQUIPMENT, INC.
1705 West Gray P. O. Box 13203
Houston 19, Texas Tele: LYnchburg 3806

PIPE FOR SALE

40,000'—3½" O.D. Standard 7.6# used line pipe—T & C.
20,000'—3½" O.D. Standard 7.6# used line pipe—P.E. Torch Cut.

Above pipe has all been machine cleaned, straigtened and is in sound condition. Available for immediate shipment.

THE INTERSTATE PIPE & SUPPLY CO.
Marietta, Ohio
P. O. Box 548 Phone 2468

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EQUIPMENT FOR SALE

FOR SALE: One 36-L Bucyrus-Erie drilling machine, complete with tools. Also 1,942 ft., new 7 inch, 17 lb., H-40, range 2, seamless casing and 2,409 ft. of new 2⅜ inch, 4.60 lb., range 2, J-55, seamless regular tubing. Box E-812, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE 2660 feet 7" OD Used casing 10-V thread A-1 condition. Bier & Vanderpool, Box 693, Plainview, Texas.

WELL drilling equipment, new or used. Spudders, rotaries, core & shot hole drills, tools, pipe, bits, blocks, pump jacks, valves. Everything for well drilling and service. Fishing tools rented. Pressey & Son, Pueblo, Colo.

FOR SALE

1, Franks Model SAL 5000 Rotary Rig, and sub-structure complete, in good condition, equipped with 3 new gas engines, including 5500 ft., 4½-in. drill stem, 3 Oilfield trucks and 2 trailers. Immediate possession, including drilling contract if desired. TERMS. Also have Oil leases in Colo., Wyo., & Nebr., for sale or farm-outs and some royalty in Colo., and Nebr.

Phone or write

SUHR, FIELDER, LOCK DRILLING CO.
Holyoke, Colo.

FOR SALE—GAS ENGINES AND GAS COMPRESSOR CYLINDERS

1—200 H.P. Clark Twin Gas Engine, 16" x 20" Power Cylinder
1—165 H.P. Bessemer Twin Gas Engine, 17" x 20" Power Cylinder
2—80 H.P. Clark Single Gas Engines, 16" x 20" Power Cylinders
1—28" x 20" Compressor Cylinder
1—24" x 20" Compressor Cylinder
2—18" x 20" Compressor Cylinder
1—16" x 20" Compressor Cylinder
1—6¼" x 20" Compressor Cylinder

All above units are complete and in good operation condition and located in Benton, Illinois.

BROWN-STRAUSS CORPORATION
1548 Guinotte Kansas City, Mo.
Norman Strauss Phone HArrison 1000

Salesmen on premises. Contact R. V. Crisp, Phone 1419 or 610, Benton, Illinois.

NEW STEEL PIPE

9,600 Ft.—24" od. x .312" wall prime, electric weld, Tested—1218 psi. 52,000 psi. min. yield, domestically manufactured, 40-foot lengths, Beveled ends.

Located at our Houston warehouse
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HOUSTON 2, TEXAS
Phone Blackstone 3261
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EQUIPMENT FOR SALE

WILSON Giant Single Drum, Skid Mounted Unit W/Ford V-8 Engine, $3,400.00; 6" Type "A" Ideal Swivel $850.00. Both Completely Reconditioned. Lum Price, 417 East 16th, Houston. UN-8945.

FOR SALE: Franchises on a new high speed drilling machine, for drilling oil wells deeper and faster. Basic Patent on drilling machine. Box E-827, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: National 50 Draw works with 2 Buda 1679 Gas or Butane Motors, Twin Disc clutches, 7½"x15" C-250 Ideal Pump, 127' Lee C. Moore Cantilever Mast, Lee C. Moore Pipe Racks, Lee C. Moore 6x18x38 Substructure, 13⅜" Shaeffer Model 34 Blowout Preventer, Link Belt Model 145 Shale Shaker, 8x20 and 8x16 steel doghouses, 5000' 4½" A.P.I. full hole drill pipe, three 6¼" Reed Drill Collars, 2 light plants, 3200 gal. Butane Tank, two 4¼" drill collars for drillin purposes and all necessary drilling in tools, 4½" to 10¾" slips and elevators, and all necessary hand tools. Rig now running 3 miles SW Caldwell, Kansas. Phone 4-0750 or 4-0721, 300 Brown Building, Wichita, Kansas.

WELL DRILLING MUD BLENDERS
We manufacture sodium humate type material, a good dispersing agent for drilling muds. Can be used alone or in combination with other drilling compounds. Write for prices and information.

American Lignite Products Co.
Ione, California

FOR SALE

200,000 feet—6⅝", 18.97# used line pipe, wrought iron, cleaned, painted, beveled for welding, Port Jervis, N. Y.

32,000 feet—12¾" used 33# line pipe, now in yard, Lancaster, Ohio. Will clean and bevel.

9,000 feet—8⅝", 28# used line pipe, Oakland, N. J.

4,000 feet—8⅝", 28# for road crossing, Oakland, N. J.

For further information or to arrange for an inspection please call us.

Rogers and Wright Co.

710 Peoples Building
CHARLESTON, WEST VIRGINIA
(Phone 30171)

FOR SALE

One six-foot-diameter, forty-foot-high fractionating column with sixteen bubble trays. Also one tubular heater having 32 four-inch radiant tubes, 18 feet long, and 119 four-inch convection tubes, 10 feet 9 inches long, steel return headers. Heater is steel frame and has suspended walls and arch. Located near Cement, Oklahoma, on Frisco Railroad. Address all inquiries to R. C. Arnold,

ANDERSON-PRICHARD OIL CORPORATION
807 Liberty Bank Building,
Oklahoma City, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: Unit Rig U-34 draw works with 2—145 GKU Waukesha engines and 2—10,000 series Twin Disc Torque converters; 1—7¼" X 14" Gardner Denver Pump powered with a V-12 LeRoi; 96' Lee C. Moore mast with 7' substructure. This rig is complete with drill pipe and drill collars, ready to drill, located at Hobbs, N. M. Sharp Drilling Company, Box 1271, Midland, Texas.

FOR SALE: 15000' Rig. Bethlehem MC-950 draw works; 3 engine chain compound with double pump drive; 3 LRO Waukesha engines; 1—7¾" X 18" G600 Bethlehem Pump; 1—7¼" X 16" G300 Bethlehem Pump; Lee C. Moore 136' Cantilever mast with 14' substructure; 3—12" QRC Cameron Blowout Preventors. This rig is complete with drill pipe and drill collars, ready to drill, located in Lea County, N. M. Sharp Drilling Company, Box 1271, Midland, Texas.

FOR SALE: Pumping units—One Bethlehem 456 DO, type 20-DO, 50 HP, peak torque 250,000 lbs., 60 HP Waukesha motor. One Emsco size 112 CH, serial No. 1203, load 150,000 lbs. RPM 252,000, ratio 9.4 10 to 1, 80 HP Climax Bluestreak Engine. Both of these units are complete with belts and ready for inspection. If interested, please contact Moran Oil Company, Phone 3-3595, or P. O. Box 2686, Tulsa, Oklahoma.

FOR SALE: At Kelly, Wyoming—National Drilling Machine #3-A-6 with WOK Waukesha engine, 12" shear poles, choice and complete 18" to 7" drilling and fishing tools, 3000 gallon Butane tank, drilling and sand lines. For further details write or call Gled Oil Co., 110 Midco Building, Tulsa, Oklahoma.

WELL SERVICING UNITS — Skid type, Single Drum Cardwells, Wilsons, Allis-Chalmers, Muskogee, Keltner. Double & Single Pole Mast. Have Draw Works on long skids w/ 86' Double Pole Rotary Mast for shallow well rotary. For sizes & prices—Write General Tool & Supply Co., P. O. Box 4387, Oklahoma City.

FOR SALE: 1—Baldwin Southwark Horizontal Duplex Pump 4 plunger 5¾" dia. x 18" stroke 470 G.P.M. @ 1000 p.s.i. 1—Bethlehem Steel Company horizontal pump 3 plunger 5⅜" dia. x 18" stroke 500 G.P.M. @ 1500 p.s.i. 2—Baldwin Southwark Vertical Triplex Pumps (1) 3¼" dia. x 10" stroke 70 G.P.M. @ 1300 p.s.i. (1) 5" dia x 10" stroke 160 G.P.M. @ 500 p.s.i. All of the above arranged for direct motor connection—no motors. Inquire of The Vulcan Detinning Company, Sewaren, N. J.

AVAILABLE for immediate delivery TWO MOBILE REPAIR SHOPS designed to provide mobile facilities for maintenance and repair of vehicles, construction and industrial equipment; test used only, equal to new. Write for further particulars: $20,000 each f.o.b Los Angeles. EXPORT TRADING CO., 1931½ Talmadge Ave., Los Angeles 27, Calif.

FOR SALE: Wilson Giant Draw Works complete with catheads, pump drive, and 2-JL-1335 Buda Motors compounded and ready to run $7500. Also 4500' 4½" good used DRILL PIPE; Butane Tank and other items at reasonable prices. Address 306 Derby Bldg., or telephone 5-4172, Wichita, Kansas.

PRITCHARD Model DBW 46-10 24' 4" wide x 65' 4" long x 45' 10" high, 10 bay atmospheric Cooling Tower, with 14 atmospheric sections. Call 4-0130, Tulsa, Oklahoma.

FOR SALE: At our Gladewater, Texas, warehouse, attention J. W. Fagan, 3 used 2½"-5"x10" Wheatley Power Pumps, direct connected to Buda Gas-Gasoline engines on steel base, $450. Cities Service Pipe Line Company, Patridge, Bartlesville, Oklahoma.

GOOD Rotary Rig Complete, 2000 ft. 4½" pipe, truck mounted hydraulic mast. Box E-845, The Oil and Gas Journal, Tulsa, Okla.

FOR SALE: Ideco 17½ rotary 4½ bushings —$2,350.00. Emsco 6AB Swivel 1450 lb.—$725.00. Mast, 65'—4—26" sheaves—$850.00. Mud Pump, G.D. 7¼x10 Climax engine complete—$5,350.00. Drill collar—6¼x32'—4½ reg. x 4½ FA Perfect $525.00. Box E-844, The Oil and Gas Journal, Tulsa, Oklahoma.

TANKS—from abandoned oil wells. Pipe, Tubing & Casing. 2—35,000 Bbl. Tanks 95x 29'; 1—35,000 Bbl. Tank 90x31'; 1—10,000 Bbl. Tank 60x20'; 1—10,000 Bbl. Tank 50x30'. Tanks will be dismantled, matchmarked, and loaded on cars. F.O.B. Pennsylvania District. Peter Grimm, 68 Schuyler Ave., Stamford, Conn.

EQUIPMENT FOR SALE

FOR SALE: 48-L Bucyrus-Erie, Trailer Mounted, Waukesha WAK Motor. 36-L Bucyrus-Erie, Trailer Mounted, Waukesha GK-140 Motor. RL Double Drum Cardwell, Skid Mounted, Waukesha GK-145 Motor. Dog Houses, Light Plants and Tremendous stock of Drilling and Fishing Tools. All equipment in first-class condition and ready to work. Will sell tools or any item separately. Special price to one purchaser for all equipment. This is worth investigating. Box 337 Farmington, New Mexico, Phone 429-W.

NOW working in South Texas area. Cardwell "Mobilehoist" double-drum workover rig, powered with Waukesha gas-gasoline 6MZ engine. 5000' rig complete with 5000' 9/16" swab line, 1" drill line Brewster 30 ton three sheave block and hook, 7" x 5½" double telescoping 55' pole. Complete with O.C.T. packoff for 2" and 2½" tubing, substructure, hand tools, etc. Less mud pump. Price $8500.00. Box E-829, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 400 ft. 8⅝ 17 lb. lapweld casing. 1600 ft. 5½ 14 lb. seamless 8 round thread range 2 casing. Box No. 635, Tel. 117, McLouth, Kansas.

ROTARY Drilling Rig complete. Steel Mast. Roller bearing throughout. 2000 ft. capacity. Two men operate. Well built. Shallow drilling, reverse circulation, clean out. Box 106, Seminole, Oklahoma.

1—10" x 11 x 5 Ingersoll-Rand Type XOB air Compressor with 145 Waukesha Engine, extra cylinders and other equipment. 1—12" x 11 x 5 Type NCTB Two Stage Chicago-Pneumatic Compressor complete with 6 WAK Waukesha Engine. Above located in Las Animas Field 17 miles SW of Hebbronville, Texas. Inquire Industrial Engine Service, P.O Box 469, Hebbronville, Texas.

FOR SALE: 87' Lee C. Moore cantilever drilling mast complete with 5'x33' substructure. Call 2-2055 Oklahoma City, or write 1514 Liberty Bank Building.

1 SUPERIOR 90 hp. twin gas compressor and 1 Superior 90 hp. twin gas engine. Alfred B. Kern, 223 Wright Building, Tulsa, Oklahoma.

Storage Tanks—FOR SALE: Eight—55,000 bbl., steel tanks with steel roofs. Located Henrietta, Texas, on railroad siding. James W. Heath, Henrietta, Texas.

EQUIPMENT WANTED

WILL PAY highest prices for used casing used line pipe, abandoned leases, or other surplus lease equipment. Your idle producing equipment is worth dollars. Green Pipe & Supply Co., Box 1383, Tulsa, Oklahoma.

WE BUY well drilling equipment machines, cable tools, pipe, etc. Turn your surplus equipment into cash. Pressey & Son, Pueblo, Colorado.

WILL TRADE 3500 Ft. 7-inch—20# NEW seamless for 5½-inch NEW pound for pound basis. Jay Kornfeld, 1121 Union National Bank Building, Wichita, Kansas. Phones 4-2121—6,0996.

HELP WANTED

GRAVITY Party Chief, operators and surveyors with experience in South America. Top salary for the right men. Present personnel advised of this ad. Box E-843, The Oil and Gas Journal, Tulsa, Oklahoma.

COMMISSION sales representative in California to introduce oil well service tools. Widely used in southwestern states. Repeat business through supply stores. Box 4426, Dallas 11, Texas.

SALES Representative now covering Rocky Mountain area, with oilfield or related equipment who can handle a line of pipe-line materials and equipment. Box E-835, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL INDUSTRY Employment Service, 405 Tuloma Bldg., Tulsa, Okla. 4-5074, Tom Robinson, owner. No fees. Needed now: Geologists with MS or Ph.D. with 3 to 10 years surface experience, willing to make 3 to 5 months trips to foreign countries and return to States for similar period prior to next asignment. Single men or childless married men best suited. (We are having success placing experienced LP-Gas men).

HELP WANTED

MAGNETOMETER operator for foreign assignment, top salary, and living allowances, transportation for family. Our personnel have knowledge of this ad. Box E-818, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

GRAVITY meter operator for foreign assignments. Top salary and living allowances for family. Prefer experience on Worden type meter. Our personnel have knowledge of this ad. Box E-819, The Oil and Gas Journal, Tulsa, Oklahoma.

OPPORTUNITIES FOR TECHNICAL REFINERY PERSONNEL for LARGE INTERNATIONAL OIL COMPANY

Entertaining applications of graduate chemical, mechanical, structural and electrical engineers for refinery engineering assignments at home and abroad.

Engineers with refinery experience and also recent graduates will be considered.

Box E-567, The Oil and Gas Journal, Tulsa, Oklahoma

OVERSEAS OPPORTUNITIES

Affiliates of

Standard Oil Company (New Jersey)

located in South America

NEED...

PETROLEUM ENGINEERS:

Positions are now available for graduate engineers experienced in drilling, production, reservoir studies, or petroleum laboratory.

EQUIPMENT INSPECTORS:

Engineering degree and several years oil refinery metals inspection experience. Will inspect oil refinery equipment and request equipment renewals where corrosion, failure, or defectiveness under safety codes makes necessary.

GEOLOGISTS:

Graduate geologists experienced in surface geology are needed as exploration party chiefs. Opportunities also for experienced subsurface geologists and photo geologists.

MAINTENANCE ENGINEERS:

Engineering degree and several years oil refinery or chemical plant experience required. Will work in planning, scheduling, and coordination of oil refinery maintenance and construction.

These are regular staff positions offering liberal salaries and benefit plans.

WRITE

giving complete address, age, marital status, education, and details of previous experience. Box 308-F, Radio City Station, New York 19, N. Y.

HELP WANTED

WANTED—SEISMOGRAPH PARTY CHIEF. Must be fully qualified. Age 27-38. A good opportunity for the right man. Box E-770, The Oil and Gas Journal, Tulsa, Oklahoma.

KEY Seismograph Personnel Needed by Established and Expanding Seismograph Company. Box E-616, The Oil and Gas Journal, Tulsa, Oklahoma.

GAS DISTRIBUTION ENGINEER

Growing natural gas company located in north central area has opening for gas engineer experienced either in preparation of material for presentation to regulatory bodies or in gas distribution work, including appliance installation on customers' premises, or both. Salary commensurate with ability and experience. Replies confidential. Box E-832, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico. Personal interview by appointment is desired. Makin Drilling Company, Box No. 1628. Ph. No. 3-3141, Hobbs, New Mexico.

WATERFLOOD ENGINEER. Graduate Petroleum Engineer. Responsible secondary and primary experience in Oklahoma, Kansas, Arkansas, Mississippi and Louisiana. Desires work with aggressive independent or small company. Future and advancements important. Box E-834, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION and Completion Engineer, Oklahoma University graduate; 2 years experience in West Texas and South East New Mexico with independent service company. Desires position with independent production company. Age 25. Available for interviews immediately. Box E-839, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION SUPERINTENDENT. Graduate Petroleum Engineer. 13 years responsible experience producing industry. Geological ability. Mid-Continent or Rocky Mountains. Box E-774, The Oil and Gas Journal, Tulsa, Oklahoma.

LANDMAN: Experienced land, lease, title, and contract negotiator. College Graduate, age 32. Currently in managerial position with Major in Williston Basin. Desires affiliation with progressive independent. Box E-828, The Oil and Gas Journal, Tulsa, Oklahoma.

ATTORNEY, experienced in land and title work, Federal income tax laws, legal investigations, now employed, desires position where legal ability can be used productively. Box E-825, The Oil and Gas Journal, Tulsa, Oklahoma.

EMPLOYED, desires change to progressive drilling or producing firm. 17 years' experience drilling, producing, petroleum engineer. Age 38. Box E-808, The Oil and Gas Journal, Tulsa, Oklahoma.

GRADUATE Engineer with 20 years' experience, both office and on the job, divided—production, gasoline and refinery processing. Experience in Maintenance, Design and Development, Construction, and Operation. Box E-842, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL Engineer—26 years, Domestic and Foreign experience, in management, construction, and engineering. Would like to contact Petroleum Operating Company, Utility Company, or Construction Firm. Box E-846, The Oil and Gas Journal, Tulsa, Oklahoma.

REAL ESTATE

OFFICE SPACE: Large new building. Fireproof, completely air-conditioned, elevator, free parking facilities for you and your customers. Draw your floor plan to suit your needs. Your office will be ready for you 60 days after we get your floor plan. Call or write: Western Chevrolet, Abilene, Texas.

ROYALTIES

WILLISTON BASIN ROYALTIES

Dealers in Montana royalties since 1921, we now specialize in royalties under major company leases in the Montana portion of the Williston Basin. For information on our method of operation, write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

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PRODUCING landowners royalty and producing leases. Any amount, any area. Confidential information required and furnished. A 1 Bank Reference.

COMBEST ROYALTY COMPANY
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Amarillo, Texas

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1504 MINERAL Acres for Sale by an Estate under 3,339 acres, located in Kearny, Gove, Scott, Greeley, Sherman counties, Kansas. $5.00 per acre. Will deal direct or through Royalty Brokers. Leonard Waddell, 1002 Walnut, Kansas City, Mo.

WILL pay cash instantly for leases (large blocks), royalties, mineral deeds, production. Write fully—P. O. Box 2153, Denver, Colorado.

DRILLING BLOCK

3,500 acres priced at $7.50 per acre, supporting geological data. 1/16th of ⅞'s override, well to be drilled to 4200', to start on or before October 1st, 1952.

Box E-837, The Oil and Gas Journal, Tulsa, Oklahoma

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Producing and Nonproducing

Bought and Sold—Any Area

Inquiries Invited

B. D. BUCKLEY

6635 Delmar Ave., St. Louis 5, Mo.

DRILLING BLOCK

10,000 acres with supporting geological data and geophysical data. Priced at $1.50 per acre with one-sixty-fourth override and well to be drilled to 2000 T.D. within 30 days after acceptance.

Box E-836, The Oil and Gas Journal, Tulsa, Oklahoma

NORTHWESTERN NORTH DAKOTA LEASES AND MINERALS

Our latest lists with prices, mailed on request. Will also buy acreage where you want it. Any place in Northwestern North Dakota. References exchanged.

BORSTAD & FITZMAURICE
Oil Properties
4th Floor 1st National Bank Bldg.
Phone 48-236 Minot, North Dakota

LEASE AND DRILLING BLOCKS

FOR SALE: Two producing wells in Mattoon, Illinois, field. All equipment in good shape. P. O. Box 823, Decatur, Illinois.

WE invite inquiries from persons interested in Oil and Gas Leases in Southern Alberta, North Central Montana and the Williston Basin. Box E-664, The Oil and Gas Journal, Tulsa, Oklahoma.

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ADVERTISING—A complete advertising service in all media—Art, copy, layout, public relations. Just two things to offer: service and ideas. Bill Dean Advertising Agency, 104 E. 9th. Phone 2-6841, Tulsa, Oklahoma.

BUSINESS OPPORTUNITIES

MANUFACTURERS! Would you like representation in Southern Oklahoma, around Duncan, Ardmore, and Ada area? An experienced sales force in close contact with drilling, production and supply companies, desires to represent manufacturer of highest quality oil field specialties. Address Box E-841, The Oil and Gas Journal, Tulsa, Okla.

ATTENTION: SALES MANAGERS

New and active Houston Oil and Industrial Sales Organization desires to expand in the Texas Gulf Area. Will assume new accounts in related lines.

Box E-840, The Oil and Gas Journal Tulsa, Oklahoma

RANCHES and FARM LANDS

ROCKY MT. RANCHES OR FARM - RANCH COMBINATION

800 acres—runs 125 cattle year round. Good pasture; good feed crops. In Rocky Mt. Vacation Wonderland! Deer hunting and fishing stream runs right through land. Rustic 5-room house; good corrals, good barn. 5 miles off cross-country highway. Free water rights. In Shadow Lake and Granby Reservoir region. On gravel road. Priced right.

Country home. 5 miles from Denver. 160 acres with 80 of it irrigated. Good water rights. Modern brick home; feed yard; supporting buildings. Ideal country home close to Denver. Good value.

1800 acres—farm and ranch combination. Well fenced. 320 acres broken balance in good grass, on good road. School bus passes place. $35.00 per acre. These values are rare in this region. If interested act immediately.

Our "Certified Listings" that protect the buyer. We have others.

Write, wire, phone us, or let us

TRADE WHAT YOU HAVE
FOR WHAT YOU WANT

LEASE AND DRILLING BLOCKS

100,000 ACRES LEASE

Southwestern Alabama

Large lumber company has approximately 100,000 acres of unleased land located between the Pollard Field and Mississippi Production. Includes several known geophysical structures. Wish to contact major company or substantial independent operator capable of developing this large property. Will deal only with principals.

Box E-831, The Oil and Gas Journal, Tulsa, Oklahoma

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JUST COMPLETED

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SHOWING: Structures, Township and Range, County Outline, County Seats. All wells drilled or drilling. Total depths, Completion Dates, Operators' names. Size 42" x 54".

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(Twenty-three county maps in stages of completion in the Basin.)

Scale: 1 inch equals 4,000 feet

Published and for sale by

NORTHWEST MAPPING CO.

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Bismarck, North Dakota

Central Area

(Continued from page 143)

T. G. Glass 1 Kotva, NE SE NW 36-4n-2e, dry, TD 2,150 ft.

Thomas S. Doran 1 Parill, SW NE SE 7-4n-4e, dry, TD 2,413 ft.

Montgomery County: Joe Reznik 1 Allen, SW SW SE 9-9n-2w, dry, TD 2,498 ft.

Richland County: Calvert Drilling, Inc., 1 Boley, NE NW NE 28-4n-9e, dry, TD 3,120 ft.

Wabash County: C. S. Higgins 1 St. John, SW SW SW 10-1n-13w, dry, TD 2,777 ft.

Washington County: Merico Mazzarino 1 Jabloniki, NE SE SW 16-3s-1w, dry, TD 1,450 ft.

INDIANA WILDCAT FAILURES

Gibson County: L. E. Kennedy and Hayes Drilling Co. 1 Thompson, SW SW SW 11-3s-12w, dry, TD 2,637 ft.

Posey County: Miami Operators 1 Wiggins, NW NW NW 23-4s-13w, dry, TD 3,037 ft.

George & Wrather 1 Ellinger, NW NW NW 25-5s-12w, dry, TD 2,320 ft.

Vigo County: Stanford Oil Co. 1 Hollingsworth, SW SE NE 10-13n-10w, dry, TD 1,932 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCATS

Henderson County: George S. Engle 1 Flack, 13-Q-20, IP 12 bbl., O'Hara 2,644-51 ft., TD 2,783 ft. (discovery well new pool).

Webster County: W. F. Lacy and George & Wrather 1 Melton, NW NE SW 9-N-24, IP 100 bbl., McClosky 2,456-59 ft., TD 2,555 ft.

WESTERN KENTUCKY WILDCAT FAILURES

Daviess County: Anthony Amadio 1 Royalty, 14-Q-27, dry, TD 1,946 ft.

Henderson County: Stanford Oil Co. 1 Bankin, 12-P-25, dry, TD 2,341 ft.

McLean County: W. F. and C. C. Royer 1 Ball, NW SE SW 18-N-25, dry, TD 1,689 ft.

Ohio County: Sam Lewis & Sons 1 Miller, 11-M-32, dry, TD 2,572 ft.

MICHIGAN WILDCAT FAILURES

Allegan County, Ganges Township: McClure Oil Co. 1 Palus, SW SE SW 12-2n-16w, Traverse 1,270 ft., dry, TD 1,287 ft.

Watson Township: Max Spidel 1 McKinnon, NW NW SW 5-2n-12w, Traverse 1,691 ft., dry, TD 1,700 ft.

Kent County, Solon Township: P. K. Degenther 1 Miller, SW NE NE 29-10n-11w, Traverse 2,403 ft., dry, TD 2,410 ft.

Sanilac County, Worth Township: J. H. Van Sice 1 Clark, NW SE SE 25-9n-16e, Dundee 854 ft., dry, TD 985 ft.

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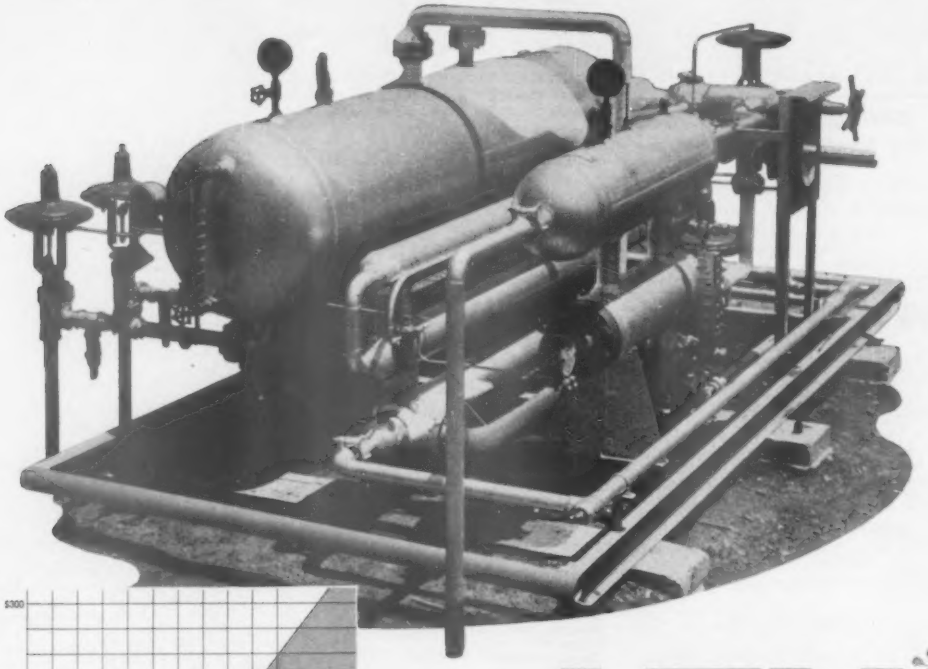
LEGAL

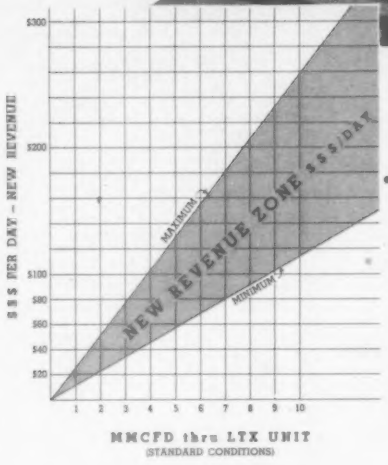
92,707.06 acres of Tribal and 23,401.58 acres of Allotted Indian Lands located in Twp. 11 N., Rges. 21 & 22; Twp. 12 N., Rges. 21, 22 & 23; Twp. 13 N., Rges. 17, 18, 19, 20 & 21; Twp. 14 N., Rges. 11, 17, 18, 19 20, 21 & 22; Twp. 15 N., Rges. 17, 20, 21, 22, 23 & 24; Twp. 16 N., Rges. 16, 17, 18, 19, 20, 21, 24 & 25; Twp. 17 N., Rges. 17, 18, 19, 20, 21, 22, 23, 24 & 25, E., BHM, in the Cheyenne River Reservation, South Dakota, are being advertised for oil and gas leasing, bids on which will be opened July 29, 1952, at 2:00 P.M., C.S.T., at the office of the Superintendent of the Cheyenne River Indian Agency, Cheyenne Agency, South Dakota. Full descriptions and copies of the advertisement may be obtained from the Superintendent, Cheyenne River Indian Agency, Cheyenne Agency, South Dakota, or from the Oil and Gas Supervisor, U. S. Geological Survey, Federal Building, Casper, Wyoming.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that 80 acres of land in T. 18 S., R. 20 E., St. Helena Meridian, Louisiana, included in the Breton National Wildlife Refuge, within the known geologic structure of the Breton Island field, will be offered in one parcel for oil and gas leasing through competitive bidding to the qualified bidder of the highest cash amount per acre, at 1 p. m., Eastern Standard Time, July 30, 1952, when bids will be opened. Details of the lease offering, how and where to file bids, and a description of the lands may be obtained by addressing an inquiry to this office. Marion Clawson, Director.

$66.00 Per Day Added Extra Revenue With...





The increase in gross revenue to be obtained from an LTX installation is a function of a number of factors. May we have the opportunity of evaluating your prospect?

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This is the first of two 10 MMCF, 1000 psi National LTX Units set on a lease in East Texas. Production figures reveal that the well made 9 bbls. of distillate per MMCF on potential test through standard separation. After setting the National LTX, production increased to 15 bbls./MMCF. The operator flows 4 MMCF/day. This means an increase in distillate recovery of 24 bbls./day valued at approximately $66.00 or $24,090.00 per year.

* T.M. Reg. U.S. Pat. Off.

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7-7-52

REGISTER and VOTE — it's YOUR country

The bundle of sticks

A wise old man called his quarrelsome sons about him. Taking up a bundle of sticks, he commanded each in turn to break the sticks. All tried, but in vain, and said it could not be done.

"And yet, my boys, nothing is easier to do," said the father, as he undid the bundle and broke the sticks, one by one. "By this example, you can see that united you will be more than a match for your enemies; but if you quarrel and separate, your weakness will put you at the mercy of those who attack you."

The useful truth of this fable is just as timely today as it was when the Greek ex-slave Aesop told it 2,500 years ago. You, a patriot, believing in individual liberty and freedom for all, see our American way of life threatened by the menace of communism abroad and jeopardized at home by complacence, negligence, confusion and incompetence.

As a business leader in your own community, you have a particular responsibility to help unify your fellow citizens and guide their thinking and action--for the strengthening and preservation of the ideals that built America, in fact, made America the envy and goal of the very individuals now seeking to destroy it. *In Union there is Strength.*

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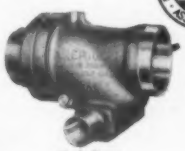
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